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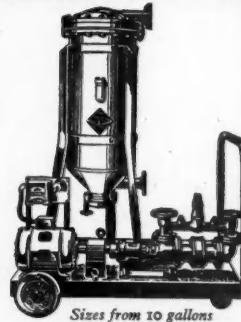
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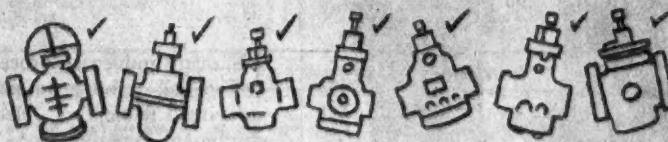
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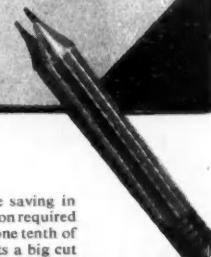


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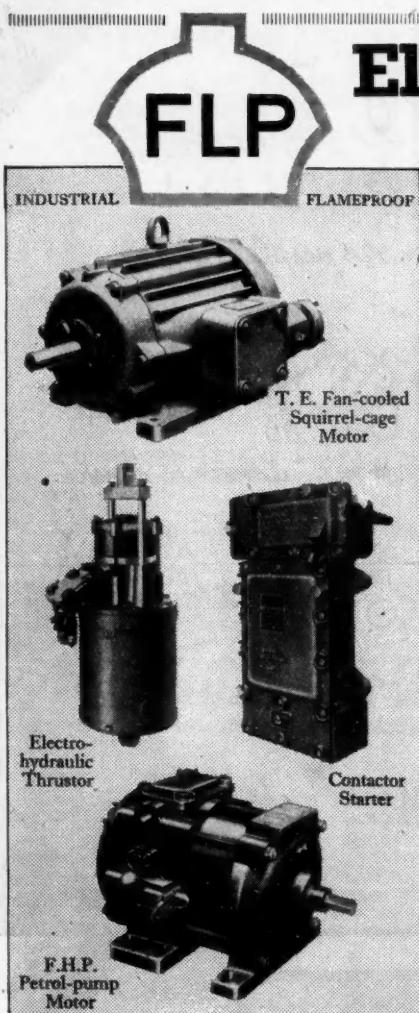
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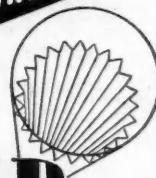
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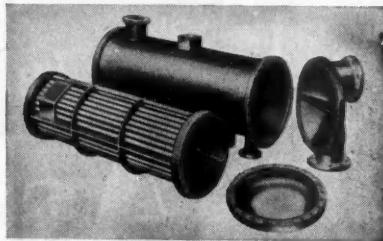
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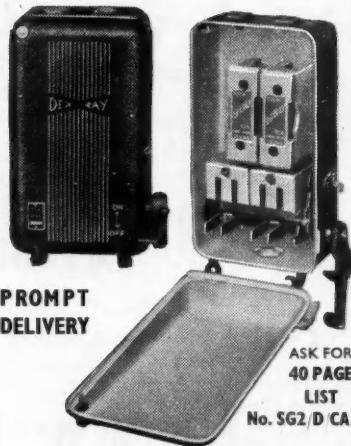
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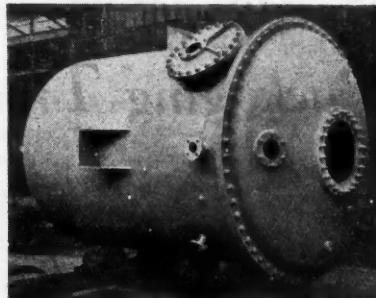
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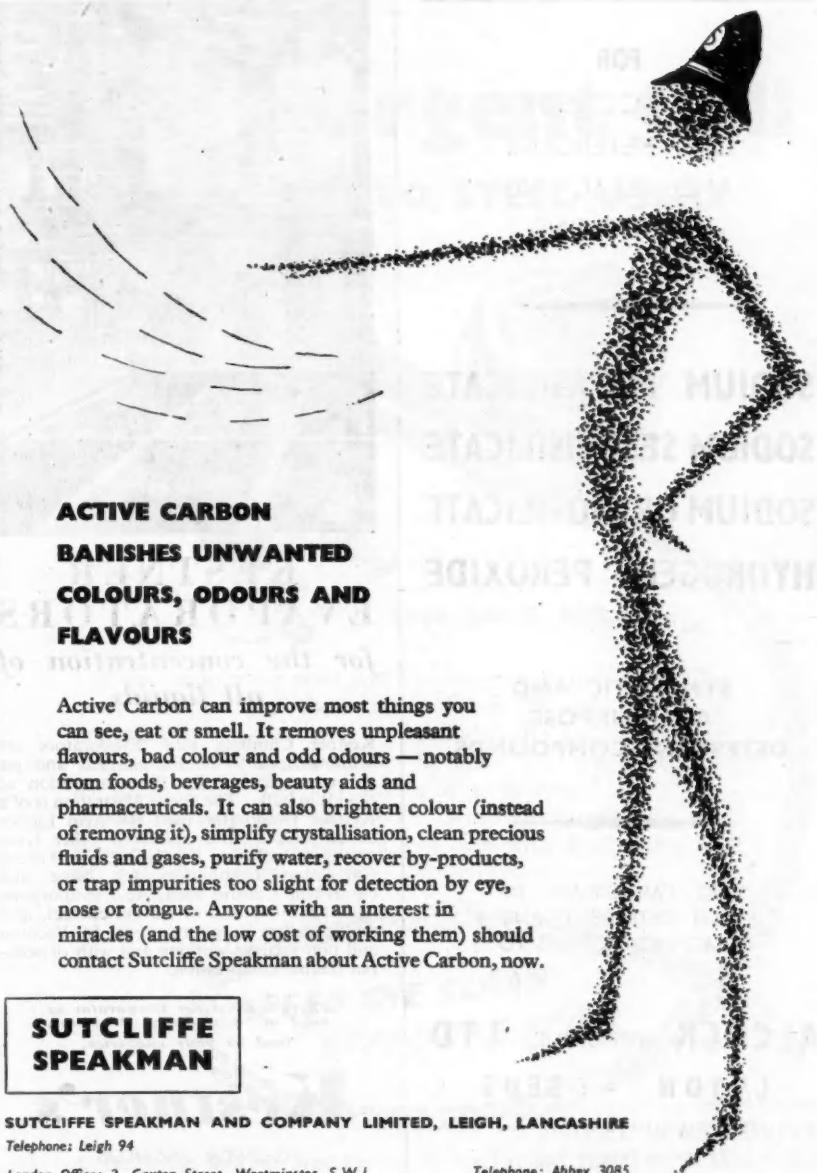
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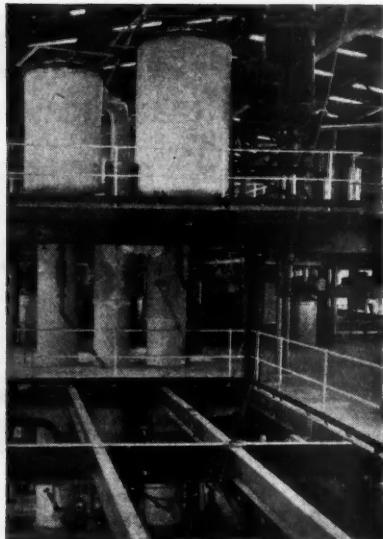
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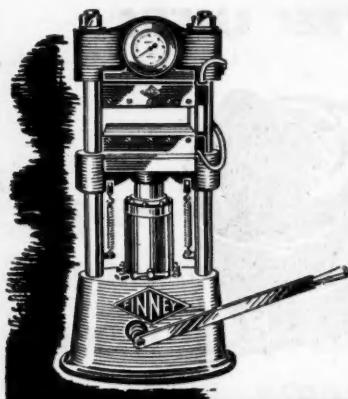
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Volume LXVI

9 February 1952

Number 1700

At the moment of going to press we learn with grief of the death of His Majesty The King. We tender, on behalf of the whole chemical industry, our deep and loyal expression of heartfelt sympathy with Her Majesty The Queen and the members of the Royal Family.

The Only Basis

M R. BUTLER'S endeavour to save our currency, for that in two or three words is the whole problem, will meet with the measure of success in exact proportion to the measure of public understanding and co-operation. And here arises the big, hard, natural fact expressed in the title of one of Herbert Spencer's works, 'The Man v. the State'; that the individual and the Government in all circumstances tend to pull in opposite directions. Normally this is a healthy state of affairs, maintaining a balance in the national economy which has served us well and brought much comfort and enjoyment in what are still

known as the bad old days. A Chancellor of the Exchequer imposes a tax and twenty or thirty million taxpayers proceed, quite naturally and for the most part quite properly, to arrange their affairs in such a way as to avoid coming within the grip of the assessors.

Twelve years, half of them war and the other half Socialism, with a 'cold' or 'phony' war added to keep the politicians busy, have brought us to the very edge of the precipice. War may serve to stimulate and revive a nation, as indeed we have seen on two or three occasions on the Continent. As a matter of economics and nothing else, the proper

cost of war can be regarded as a big bad debt which hits an industrial enterprise, but if treated as a loss of capital, and if the profit-making capacity of the enterprise is maintained, is a difficulty many a concern has faced and surmounted. The situation is, however, not nearly so simple. In modern times monetary inflation has been used deliberately as an instrument of war and a means of hiding from the people the suffering and sacrifice which war must obviously involve. In our own case we have adopted this easy device to the point of extreme danger and our survival depends upon the extent to which we have retained that hard horse commonsense which was characteristic of our forebears and are able to recognise the folly of our recent ways. Millions of our people have been led to believe that war damage and social betterment are proper bedfellows and must now suffer the consequence of that wicked political deception.

These monetary tricks in which we have indulged with so light a heart can be explained in elementary terms which does not mean that such an explanation is capable of rapid or easy application. If a yard or a stone or a gallon of some material or commodity contained, at the pre-war price, £1 of wages and now contains £3 for the same real value, it would not matter very much if we could achieve a closed economy. Were we self-contained, as for all practical purposes is America or Russia, it would not matter if the price on the omnibus ticket

was £5 instead of 1½d. But we are not in that happy position. We want half our food. As in the last analysis all international trade is barter, it is clear that having made a wage of £1 into a wage of £3 the foreigner must require three times as many of the depreciated pounds for what he exports to us. Far too many politicians take the easy line and talk of the higher prices of imports, when the nearer truth is the lower value of the pound.

At a time like this, when the national belt must be tightened as never before, it should help to recall the old arguments of the consumer versus the producer and to remember that we entered this unhappy twentieth century with the highest standard of living ever known in any country at any time, and whatever the faults and shortcomings of that arrangement may have been, we based all our economic thoughts and actions upon the theory that the consumer interest was the only basis of a sound economy.

Since those days we have been seeking after money, voting it to ourselves, and satisfying our desires by the use of various unorthodox devices, not excluding the printing press. Meanwhile we have maintained a widespread system of trade practices invented for the purpose of limiting output and although statesmen of all parties have waxed eloquent on the dangers of more money chasing fewer goods, the real nature of the problem has still to be understood, perhaps through bitter experience, by our people as a whole.

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Notes & Comments

Time is Money

TWO items in the news recently call attention to those two rather neglected fields of human endeavour—reading and speaking. The first is undoubtedly of great potential benefit to mankind and concerns the gradual evolution by education and psychology of more rapid reading techniques. Modern ideas about reading tend to teach the eye to travel down the page in a vertical line (strangely enough, what the Chinese have been doing, more or less, for centuries), rather than across each line of print. To do this it is necessary to relax the eye muscles to such an extent that they embrace the whole line by glancing at its centre, a feat possible, it is said, after only a short period of training. If everyone could do this it is obvious that the total time saved would be prodigious. To be able to skip through the chairman's speech from 'It is a very great honour . . .' to the list of tributes at the end, in less time than it takes to tear it up, is to lay in reserves of the world's most priceless commodity. The reports, articles, letters and books that lay siege to a busy man's time deprive him of hours that could be devoted to more productive work. Much effort is expended on how to write intelligibly nowadays. It is time people started learning how to read in the best way.

'Ghost' Writing

THE second subject in the news is of more doubtful value to mankind. The American University, of Washington, U.S.A., has announced that it has introduced a course into its curriculum on 'ghost' writing. The object of the course is 'to teach students to write in such a way that orators will understand at all times what they are saying.' This is in marked contrast to the usual run of university courses, which usually teach people to understand what they are listening to, and reflects rather dubiously on the performance of some present-day speakers. More to the

point, perhaps, would be a course to teach the speakers themselves to understand what they are saying; the average audience is probably just as intelligent as the average speaker, but many speakers as soon as they rise to their feet appear to regard their audience as downright woolly, if not mentally retarded. In any case, a large proportion of the orators the university has in mind devote themselves to politics, and as the measure of a political speaker is his ability to conceal from his audience what he does not want them to know, and pump into them what he does, at the same time avoiding awkward questions and insulting people with views opposite to his own, it would be naïve to suppose that he does not understand exactly what he is saying. The only virtue about the proposed course would appear to relate to after-dinner speakers. If some of them really understood what they were saying, there is a sporting chance that they might realise the futility of saying it.

Youth and Industry

IMPORTANCE of getting young people into suitable employment seems at last to be gaining the attention it deserves both from Government and employers, and in many ways the arrangements made by the Youth Employment Service, now being operated by local education authorities and the Ministry of Labour for placing the younger boys and girls is proving its worth. This need for greater co-operation between educational establishments and industry in Great Britain was one of the points emphasised in its recent report by one of the four Productivity Teams which visited the U.S.A. last year to study problems of training for industry. In America the position is arriving where all journeymen and apprentices will be high-school graduates and the majority of other employees will have had high-school education up to 17 or 18 years of age, and it is fortunate that the peril of securing economy in

education by lowering the school leaving age has been avoided. Youth, faced with a period of two years national service, is far too inclined today to take a post with quick money rather than real prospects. By the time Army service is over it may be too late to learn a trade. The regional apprentice training scheme recently launched by the Unilever group is of considerable industrial and social significance. Five of the group's concerns in the North-West have pooled their training resources to ensure that every boy who learns a trade is encouraged to the best of his abilities.

The steel industry also has a form of co-operative apprenticeship to provide wider training than some individual firm's can give. Further schemes of this kind might well be developed. Training of young people deserves the careful consideration of the chemical industry which depends to a large extent on the services of well-trained technicians to make the best use of the ability of its research workers. Indeed the whole question of improving the man-power situation in Great Britain may be said to depend on the improvement of both general and technical education.

Iodine Made Less Toxic

THE discovery that if iodine is combined with certain surface-active agents or water-soluble polymers it loses its toxicity and irritant effects on human tissue while retaining its strong germicidal properties was reported by *Chemical Week* recently. The loose chemical compounds formed result in a great lowering of the element's vapour pressure, elimination of its skin-staining properties, and lack of sting on application or other unpleasant after-effects. The 'iodophors' can be diluted with water without precipitating iodine, and they contain the iodine in part titratable and in part not titratable, the ratios of these parts being to some extent adjustable by altering the pH. Anhydrous solutions of iodine in the carrier are stable, and in water can contain as much as 25 per cent iodine. General Aniline and Film Corporation is reported to be making the first of the new compounds at Easton, Pa. The iodophors are not expected to compete seriously with such germicides as the quaternary ammonium compounds, but may displace them in hard or cold water. They are not compatible with soap.

To Produce Vinyl Resins

A LARGE \$2,500,000 plant to produce types of vinyl resins which are now imported will be added to the vinyl chloride resin division of Canadian Resins & Chemicals, Ltd., at Shawinigan Falls, Quebec.

Construction of the new plant, seventh to be built at Shawinigan Falls since the company was established in 1941, will begin

early this spring and will be completed in 1953. This resin plant is in addition to the \$1,000,000 new calendar line for the compounding division which the company has under construction at present.

Of the new resins to be produced, probably the most important are the vinyl chloride dispersion resins which as fluid mixtures can be poured into moulds, spread on to cloth, sprayed on to various surfaces, used in baths for dip-coating articles or application to the external surfaces of forms.

With these resins, the equipment which is used to coat fabric for upholstery is also used in military applications such as army raincoats, ponchos, tents and tarpaulins. 'Slush' moulding equipment which now produces lifelike dolls can produce gas-masks. The machines built to produce vinyl footwear can be turned to the production of boots for amphibious operations.

A promising development for these resins is the new vinyl foam materials, characterised by high buoyancy and exceptional insulation values, which are being studied for use in unsinkable rafts and floats, and as non-oxidising flame-resistant, sponge-type padding for the interior of ships and vehicles.

The coenzyme trophosphopyridine nucleotide, isolated from liver in extremely small amounts, is so expensive that Armour & Co., of Chicago, can only give it away, it is reported. The quoted price is about £300 per gram, but there is no commercial use for the product.

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Fertiliser Prices

Increases in the Permitted Maximum

PRICE increases in fertilisers, other than potash and basic slag, ranging from 5s. 6d. a ton for superphosphate to 23s. a ton for sulphate of ammonia, came into effect on 1 February.

This rise in the permitted maximum prices of fertilisers is stated by the Ministry of Materials to be mainly due to the higher costs of sulphuric acid, bags, transport, coal and wages. Some of these additional costs have been operating since last autumn.

These increases are being taken into account in fixing the rates of contribution that will be paid to farmers towards the cost of phosphatic fertilisers as announced recently by the Ministry of Agriculture and Fisheries.

Details of the increases involved are as follows:—

(a) **Sulphate of Ammonia**—March/June prices for not less than six-ton lots will be increased from £15 15s. to £16 18s., or by £1 3s. a ton.

(b) **Basic Slag**—Price will remain unchanged.

(c) Compound Fertilisers

(i) **National Compounds**. Prices will be increased as follows:—

Old Price	New Price	Increase
£ s. d.	£ s. d.	£ s. d.
1A 20 1 6	21 5 0	1 3 6
3A 18 9 0	19 10 6	1 1 6
5A 18 2 0	19 1 6	19 6
6A 19 8 0	20 10 6	1 2 6
7A 20 6 0	21 2 0	16 0
8A 17 4 6	18 3 6	19 0
9A 19 11 0	20 15 6	1 4 6

A new National Compound No. 6B, composition: N, 6 per cent, soluble P_2O_5 , 8.5 per cent, insoluble P_2O_5 , 3.5 per cent, K_2O , 6 per cent, will be included in the Instrument, the standard price per ton being £21 14s.

(ii) Other Compounds

New prices for non-National Compounds are calculated by taking the prices obtaining in the 'basic period' (the period of two months ending on 30 June, 1951) and adding £2 2s. 3d. instead of £1 10s. 9d. and additionally for each unit of

N (pure nitrogen in the form of sulphate of ammonia)	4s. 5d.	(3s. 3d.)
Phosphoric acid (P_2O_5 soluble)	8s. 1d.	(7s. 10d.)
Phosphoric acid (P_2O_5 insoluble)	3s. 10d.	(3s. 6d.)
K_2O as muriate of potash ..	1s. 8d.	(1s. 7d.)
K_2O as sulphate of potash ..	1s. 2d.	(1s. 2d.)

Previous additions per unit are shown in brackets.

(iii) C.C.F's

The price for C.C.F's (N, 12 per cent, soluble P_2O_5 , 11.9 per cent, insoluble P_2O_5 , 0.1 per cent, K_2O , 15 per cent) will be increased from £26 14s. 6d. to £27 9s. or an increase of 14s. 6d. a ton.

(d) **Ground Phosphate** (29 per cent P_2O_5). Increase will be by 9s. a ton, from £12 2s. to £12 11s. The differential of 8s. 4d. a unit will be increased to 8s. 8d. In Northern Ireland increase will be by 5s. a ton, to £11 9s. Differential will be 7s. 11d.

(e) **Potash**—The price of muriate and sulphate of potash will remain unchanged.

(f) **Superphosphate** (18 per cent P_2O_5). Increase will be by 5s. 6d. a ton, from £14 13s. 6d. to £14 19s. The differential of 16s. 4d. a unit will be raised to 16s. 7d. In Northern Ireland increase will be by 2s. a ton, to £14 4s. 6d. Differential will be 15s. 10d.

(g) **'Nitro-Chalk'**—An increase of £1 2s. a ton, i.e., from £14 11s. to £15 13s.

Small lot allowances and early delivery rebates will remain unchanged.

Standard price in Northern Ireland for a compound fertiliser containing N, 3.75 per cent, soluble P_2O_5 , 11.5 per cent, insoluble P_2O_5 , 1 per cent, K_2O , 8 per cent, is increased by 16s. 6d. a ton to £20 13s. The price of a compound differing from that described above will be calculated by adding or deducting from £20 13s. the following sums in respect of differences in specifications:—

	per unit
N (pure nitrogen in the form of sulphate of ammonia) per unit ..	16s. 11d. (15s. 9d.)
Phosphoric acid (P_2O_5 soluble) ..	15s. 10d. (15s. 8d.)
Phosphoric acid (P_2O_5 insoluble) ..	7s. 11d. (7s. 9d.)
K_2O as muriate of potash ..	6s. 10d. (6s. 9d.)
K_2O as sulphate of potash ..	9s. 0d. (9s. 0d.)

Production charge levied on home produced phosphatic fertilisers under the Fertiliser (charges) Order, 1951, will vary from 1 February as follows:—

(a) **Basic Slag**—The levy on ground basic slag of grades from 6 to 10 per cent P_2O_5 content will be withdrawn and for higher grades the charge will be decreased by 8s. a ton. New charges will be: 6 to 10 per cent, inclusive, nil; 11 per cent 1s.; 12 per

cent 5s. 6d.; 13 per cent 11s. 6d.; 14 per cent 17s. 6d.; 15 per cent 23s. 6d.; 16 per cent 28s.; 17 per cent 34s. 6d.; 18 per cent 43s.; 19 per cent 51s. 6d.

(b) **Superphosphate**—The present charge on home produced superphosphate will be reduced by 3s. a ton.

(c) **Triple Superphosphate**—Containing not more than 45 per cent P₂O₅, will be reduced by 7s. 6d. a ton, and over 45 per cent P₂O₅ by 8s. a ton.

(d) **Compounds**—On CCF's containing 12 per cent P₂O₅ in the form of ammonium phosphate the production charge levied will be decreased by 2s. a ton. The differential will be reduced to 9d. a unit.

Copies of the Orders, the Fertilisers (Prices) Order 1952, S.I. 1952, No. 113, and the Fertiliser (Charges) Order 1951 (Amendment) Order 1952, S.I. No. 116, may be obtained from His Majesty's Stationery Office, price 6d. and 3d. respectively.

Increased Glycerine Prices

DUE to a decrease in production of glycerine the Control recently found it necessary to reduce allocations. Large quantities of crude glycerine have been purchased from sources overseas, as a result of which it is hoped that the present allocation may be maintained.

World market prices had to be paid, however, and these were very much higher than those in force here. Owing to the increased cost of this imported crude glycerine, together with higher manufacturing and transport costs, an advance of £10 per ton on home trade prices for chemically pure and industrial glycerine was necessary.

New prices came into effect on 1 February.

Refined pale straw industrial glycerine (1.260 S.G.) is 5s. a cwt. less than chemically pure.

A revised price list has been issued by Fredk. Boehm, Ltd., of Bentinck Street, London, W.1, distributors, also by Glycerine, Ltd., of Unilever House London, E.C.4, which points out that the new prices will apply to all licences dated on or after 1 February, but releases dated January will be charged at the old rates, even if they are invoiced in February.

Both companies make the reminder that forward commitments cannot be undertaken during the control and prices are subject to alteration without notice.

Bulk Grain Fumigation

MUCH of the grain imported into Great Britain carries some degree of infestation by insects. How this problem can be tackled by the fumigation of grain in bulk was discussed by W. Burns Brown (Pest Infestation Laboratory, Slough), in a paper delivered to the Crop Protection Panel of the Agriculture Group of the Society of Chemical Industry held in London on 5 February.

Considerable tonnages of grain are disinfested by fumigation at the time of arrival and fumigation may also be called for in the treatment of the infestations which occasionally develop in the reserve stocks that are being held in store for long periods.

Experience has shown, however, that the methods used in Great Britain for fumigating grain in bulk cannot always be depended upon to give complete control.

Investigations which have been continuing over a number of years at the Pest Infestation Laboratory have led to the conclusion that completely reliable results can be expected only when distribution of fumigant through the bulk is artificially assisted. This is most readily arranged in silo bins.

The lecturer recently visited Switzerland where fumigation in silo bins fitted for gas circulation was used extensively and he discussed briefly the design and operation of such plants.

Gasification Process Acquired

FOLLOWING the statement made by the chairman at its annual general meeting the Power-Gas Corporation, Ltd., of Stockton-on-Tees, announces that it has acquired the United Kingdom and Commonwealth rights covering the Panindeo coal dust gasification process of the Compagnie Pan-Europeenne d'Installations et d'Équipement Industriels.

The process has been developed following experience of coal dust gasification gained with the Schnalfeldt plants in Germany and employs the principle of gasification by entrainment in preheated steam, air and oxygen. It is especially suited for dealing with reactive low grade fuels and can be operated to provide various types of gas, particularly synthesis gas where a low hydrocarbon content is required.

A demonstration plant has been built in France and is used for preliminary trials on various fuels to establish design data for industrial projects.

French Oil Refinery Extension

Capacity at Berre Trebled by New Plant

PRINCIPAL features of the £8,000,000 extension to the Shell Berre oil refinery near Marseilles, which was opened on 17 January (THE CHEMICAL AGE, 66, 179), are the construction of an entirely new crude distillation ('topping') unit and of a modern reforming plant, using more than 95 per cent French labour and materials.

By means of the distillation unit (capacity 8,000 tons a day), a process is carried out in which the crude oil is separated into a complete series of products ranging from liquid gases to fuel oils. Its outstanding components are six fractionating columns, one of which, weighing 300 tons, is among the largest in Europe.

The 1,200-ton-a-day reformer transforms part of the distillate into high-octane fuels using a high-temperature cracking process. The great increase in productive capacity at Berre—crude oil throughput is now nearly 3,000,000 tons yearly, six times greater than before the war—is largely due to these two units.

Some of the remaining product of the distillation unit acts as feedstock for a catalytic cracking plant of the Houdry type, producing aviation and motor gasoline; by the end of 1953 there will be in addition a 'cat-cracker' employing the more modern fluid catalytic process. For this unit advantage will be taken of the basic layout which has been used for the 'cat-crackers' already in operation at the Shell refineries at Pernis (Holland) and Stanlow (U.K.) and which involved a design effort of 1,000,000 man-hours.

Storage Space Expanded

Storage capacity at Berre has been expanded to over 500,000 tons, a large part now being set aside for crude oil from the Middle East. The tanks are fed by pipeline direct from the growing oil port of Lavéra, 21 miles distant on the Mediterranean. Some 200,000 tons of products are despatched each month from the port of La Pointe, on l'Etang de Berre, the 'inland sea' adjoining the refinery. In addition, a special railway system and road dépôt have been built to serve the refinery.

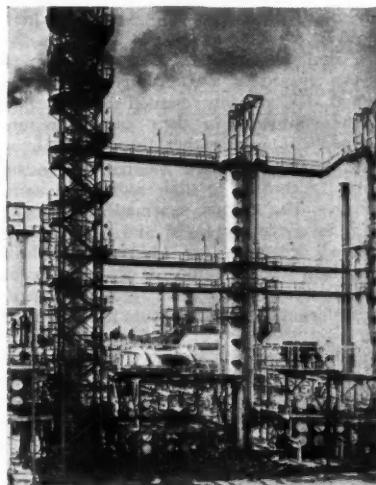
At Rognac nearby is what is claimed to be the world's largest filling plant for liquid

gases, having a storage capacity of 2,600 tons. Both Butagaz (butane) and Propagaz (propane) are piped from the refinery to this installation. It is owned by Soc. pour l'Utilisation Rationnelle des Gaz (URG), a Shell subsidiary which markets these products throughout France.

Feedstock for the refinery is being derived about 70 per cent from Kuwait (on the Persian Gulf), with smaller quantities from Iraq, Venezuela and elsewhere—including France and Algeria.

Official opening of the extension which was performed by M. André Charon, president of Cie. de Raffinage Shell Berre and also of Shell Française, marked a further stage in the development of Western Europe's oil refinery programme.

This plant is now one of the largest in France, and Shell Berre with its other installations at Petit-Couronne (near Rouen) and Pauillac (Bordeaux), controls a strategically sited enterprise with a total capacity already of over 5,000,000 tons a year.



[Shell photograph]
Fractionating columns, which form an important part of the extension to the oil refinery at Berre

Causes of Industrial Dermatitis

Emotional Factors Involved

THE *Lancet* of 15 December last contains an interesting article on the causes of industrial dermatitis. This malady is one of the more serious occupational diseases in industry, and the fact that it is responsible for so much time lost and so much compensation paid out makes any investigation into its cause and prevention of great importance. At present, there is, as was remarked in the subsequent discussion, an abysmal gap between methods of statutory recognition of the condition and its prevention. Skin diseases of the nature of dermatitis are often difficult to deal with, and the evidence of Dr. Mark Hewitt, M.B., Lond., M.R.C.P., senior Registrar in Dermatology, United Bristol Hospitals, in *Lancet* sheds valuable light on their sometimes obscure origins.

Skin Reactions Outweighed

In a study of unemployed disabled people registered at exchanges with skin disease, 70 per cent claimed to have had industrial dermatitis. Unsatisfactory work records and severe social and emotional difficulties, however, were found to outweigh by far their skin reactions, and an examination of the social setting and occupational background of 80 patients revealed that the cause of the complaint in these cases was undoubtedly internal rather than external.

Dr. Hewitt classified the patients in six groups, according to their social and work records. The chronic sick and at the same time chronic unemployed and registered as disabled accounted for 13 cases. All of these had such bad records that there was little hope of any of them regaining economic independence. They were all convinced that a return to work would aggravate their condition—one even stating that he thought he would get well provided that he continued to receive compensation—and in only one or two cases was there the slightest evidence of work causing the skin condition. In group two, that of six respected elderly workmen, emotional factors found to influence dermatitis outbreaks were fear of retirement with its incumbent inactivity, financial worries and loss of friends, as well as plain old age and lack of emotional resilience.

Explanation of this to the patients often helped to reduce the complaint.

Group three contained nine men who had settled down to fairly stable employment only after much early instability, and had then again lapsed into unsettlement with the outbreak of eczema. Group four accounted for 15 patients who all suffered from difficulties of readjustment to changed environment either through change of job for the worse, conscription, or undue coercion into jobs they did not like. Resentment manifested itself here in the form of eczema.

Of the 21 men in the fifth group—those with good and fairly good work records—all but one were suffering from constitutional skin disease, and change of occupation did not influence the course of the disorder. Sixteen women comprised the sixth and last group. All these were associated either with catastrophes in their private lives; or maladjustment from one or other causes.

The evidence afforded by these groups of people goes to show that industrial dermatitis may often be an occupational neurosis rather than an occupational disease. Its rising incidence has been peculiarly associated with advances in social legislation designed for the public health, and although the increase has been attributed to new manufacturing processes, this theory is refuted by the increased incidence among miners, where the dermatitis hazards have not materially altered. The condition constitutes a grave source of discontent and resentment, usually misplaced, against employers, who are naturally blamed for the outbreak, and the importance of individual investigation of cases is brought out by Dr. Hewitt's report. Perhaps a realisation that labelling all dermatitis outbreaks as 'industrial' may be helping to encourage exactly what it sets out to cure will eventually decrease the scourge. Dr. Hewitt's report deserves wide circulation.

Glaxo Laboratories, Ltd., have announced that the joint secretaries and the stock transfer office have moved to 1 Carlos Place, London, W.1, as from 4 February, 1952. Telephone No. GROsvenor 8771.

Drugs, Fine & Medicinal Chemicals During 1951*

by G. COLMAN GREEN, B.Sc., F.R.I.C., A.M.I.Chem.E.

AS indicated in the first part of this review, the problems of supply of cortisone as well as other related steroids is formidable. One American manufacturer is reported (*Dr. and Cos. Ind.* 1951, 69 (4), 454) to be manufacturing the so-called compounds B and F on pilot-plant scale by a partial biosynthetic process. Adrenal glands are quick-frozen immediately after the animal is killed. They are then minced and incubated for half-an-hour under aerobic conditions with desoxycorticosterone synthesised from naturally occurring vegetable steroids. This is said to lead to the formation of corticosterone. To obtain compound F, 11-desoxy-17-hydroxycorticosterone is incubated with the minced glands. 17-Hydroxycorticosterone predominates in the medium but some cortisone is formed. It is claimed that the partial biosynthesis produces 12 to 15 times more biological activity than could otherwise be extracted from the same amount of hogs' adrenal tissue.

Two notable advances in steroid chemistry have been achieved during 1951 by Woodward in the U.S.A. and Robinson in the U.K. These workers have completed the total synthesis of the steroid molecule and, doubtless, their efforts in this direction have been increasingly stimulated by the rapidly developing need to synthesise cortisone and its closely related steroids from readily accessible starting materials and by simpler routes.

Route Described

Robinson and his co-workers (*Chem. and Ind.*, 1951 No. 20, 389) describe the route to the total synthesis of the androgenic hormones and, in particular, to epiandrosterone acetate. The route is complex, and the authors' note and subsequent memoirs should be studied.

Woodward almost simultaneously announced the total synthesis of the steroid molecule in the Centenary Lecture to the Chemical Society of London on 26 April (*J. Amer. Chem. Soc.*, 1951, 73, 2405-3547).

Young *et al.* (*Nature*, 1951, 168 (4285), 1044) have found that fair resolution of the more active components of adrenotropic hormone could be achieved by chromatography

on ion-exchange columns, in mild conditions, at neutral pH and room temperature. Active material could be separated largely from inactive material. 50 to 100 per cent of the biological activity was recovered in fractions containing less than 5 per cent of the ninhydrin positive material. The main protein component was found to be essentially inactive.

Fractions Separated

Young and his colleagues (*Nature*, 1951; 168 (4286), 1084) also describe the action of such fractions in 'adrenal repair' and on adrenal ascorbic acid content. Pituitary extracts were fractionated in this case on 'Amberlite IRC-50'. They found that they were able to separate fractions causing an adrenal weight-increasing effect from fractions causing an ascorbic-acid-producing effect. They conclude that the existence must be assumed of at least two factors which may be described under the terms adrenotropic hormone.

In 1944, Li and Evans (*Science*, 1944, 99, 183; *J. Biol. Chem.*, 1943, 149, 413) claimed the isolation of a growth hormone as a homogeneous protein. This followed the observation that hypophysectomised animals failed to grow, but resumed growth when fresh anterior pituitary substance was injected peritoneally. The action of the hormone on body growth, and especially on skeletal tissues, was found to be antagonised by corticotrophin and augmented by thyrotropic hormones.

Reid in 1951 (*Nature*, 1951, 168 (4823), 955) has followed up an observation by Li and Evans that the activity of the growth hormone is destroyed by treatment with acetic anhydride, and has confirmed that phenylalanine is a terminal group of the growth hormone by using Sanger's fluorodinitrobenzene technique (*Biochem. J.*, 1945, 39, 507). Reid proceeds to show that the growth-promoting activity of the hormone depends upon the integrity of the α -amino groups, but not upon that of the ω -amino groups. This demonstration followed the observation that by careful selection of

* Continued from the issue of 12 January, pp. 101-103

conditions, acetic anhydride could be used to acetylate the one form of the amino-group but not the other.

During 1951, world-wide attention has continued to be directed to the antibiotic field, to the elaboration of therapeutics with known antibiotics and, up to the present, in a relatively minor degree, to the discovery of new antibiotics. Penicillin still remains of paramount interest in the field, but great attention continues to be directed to streptomycin, especially in its application in tuberculosis.

Character Important

The character of the vehicle used in preparations of penicillin depot injections is of great importance in regulating the speed of diffusion from the dépôt. B.P. 658,783 describes the use of oleyl alcohol as a suitable vehicle. Among the advantages claimed is that, if segregation occurs in storage, it is readily dispersible, which is in contrast with what happens when penicillin is dispersed in arachis oil which is the more usual vehicle. It is conceded in the patent that, in dispersing penicillin in oleyl alcohol, some esterification may occur.

The problem of maintaining high penicillin blood levels continues to be attacked; 80 per cent of administered penicillin is excreted in urine but the rate of excretion may be delayed by 'blocking' in some manner the diffusional processes in the kidney tubule by the simultaneous administration of such adjuncts as diodone, *p*-aminohippuric acid, sodium benzoate and caronamide. There are objections to the use of these adjuncts, not least of which may be the nauseatingly large quantities to be administered. There is also the fear that the use of caronamide may adversely affect the kidneys, a belief which Walker and Hunter (*Lancet*, 1951, *ii*, 104) consider unfounded. These authors consider that the problem of long-lasting penicillin blood levels has been largely solved by the introduction of procaine penicillin and that caronamide is best reserved as an adjuvant in super-massive penicillin dosage as is required in bacterial endocarditis. These workers subscribe to the view that these adjuvant drugs act by blocking a conjugation enzyme system and they find that 'Benemid' [*p*-(*di-n*-propylsulphamyl)-benzoic acid] acts similarly to caronamide. The question followed as to whether this drug would permit the oral

administration of penicillin to avoid the inconvenience of injection. They found that 'Benemid' administered simultaneously with procaine penicillin did give satisfactorily enhanced blood levels. Sodium penicillin gave less satisfactory results and a penicillin ester ['L.G.2' (Glaxo)] proved unsatisfactory in this mode of administration.

The observations are interesting since oral administration of penicillin is so convenient, but must at present be largely restricted to prophylactic use. Severe infections likely to result in death such as subacute bacterial endocarditis, meningitis and syphilis require prolonged high blood penicillin levels which cannot be achieved by this route. Usually, three or four times the amount of penicillin must be given orally as by injection to allow for destruction of penicillin by the acid contents of the stomach and of the enzyme, penicillinase, in the upper intestine; but, perhaps, a greater impediment to oral administration than either chemical or biochemical destruction in the alimentary canal, is in the great variability shown by the intestine in absorbing penicillin (Stewart & May; *Lancet*, 1947, *ii*, 857).

Jensen & Dragstedt described in 1950 an ester of penicillin which showed considerable selectivity for lung tissue. This was an important observation because, ordinarily, systematically administered penicillin does not reach the sputum in effective concentrations, and the benefits of the antibiotic in chronic lung infections have been consequently limited. The ester used by these Danish workers was benzylpenicillin 'diethylaminooctylester hydroiodide'. Heathcote and Nassau (*Lancet*, 1951, *i*, 1255) have studied the hydrochloride of the ester which is more soluble in water than the hydroiodide. They found that with the hydrochloride ('L.G.2') the penicillin level in the sputum two hours after intramuscular injection was very nearly four times as high as when sodium penicillin was injected and over ten times as high as when procaine penicillin was injected.

Chloromycetin Appraised

Chloramphenicol (chloromycetin), the only synthetic antibiotic which has been admitted to the 1951 Addendum to the British Pharmacopoeia of 1948, as mentioned in the first part of this review (CHEMICAL AGE, 1952, 66, 103), is receiving wide appraisal. Its wide bacterial spectrum has been appreciated for

some time past. It is established as being effective against a range of both gram-positive and gram-negative bacteria, against rickettsiae and some of the larger viruses. Chloramphenicol is effective by the oral route, peak blood levels being attained in two hours and therapeutically effective levels being maintained by a single oral dose for eight hours or more. Its nitro-group (which is unique in a compound of natural origin) lends itself readily to assay, which depends upon reduction to the corresponding primary amine followed by diazotisation and coupling with N-(1-naphthyl)-ethylenediamine. Potency must be assayed by turbidimetric bacteriological methods to differentiate between the active compound present and any inactive degradation products.

Volini *et al.* (*J. Amer. Med. Ass.*, 1950, 142, 133) utter a warning note and suggest an intensive study of chloramphenicol is called for before it can be considered absolutely safe, especially in massive dosage. These workers report profound blood and marrow changes in patients suffering from certain systemic infections susceptible to chloramphenicol therapy.

Aureomycin and terramycin resemble chloramphenicol in their effectiveness against Rickettsial diseases (such as typhus and scrub typhus) and some virus diseases. Physiologically and biochemically, the selectivity of action of these antibiotics is very striking because of the strong structural resemblance of viruses to parts of the cell structures of the host.

Carlile *et al.* (*J. Amer. Pharm. Ass. (Sc. Ed.)*, 1951, 40 (11), 535) find that terramycin is absorbed from the alimentary tract at about the same rate whether administered as base or hydrochloride, despite the insolubility of the base in the physiological range of pH.

Growth-Promoting Effects

Stokstad *et al.* have reported on the growth-promoting effects of aureomycin to the 12th International Congress of Pure and Applied Chemistry held in September; $\frac{1}{2}$ oz. aureomycin per ton of feed is now widely used for feeding poultry and pigs in America. No abnormal final size is achieved by the adjunct, but the final size is reached more quickly. This is considered to be due to the inhibition of harmful intestinal bacteria although such bacteria harm-

ful to the rapid achievement of maximum growth have not yet been isolated.

Mattick *et al.* (*Nature*, 1951, 168 (4276), 659) report the isolation of a heat-labile antibiotic from *Lactobacillus helveticus* which in culture fluid is about twenty times more powerful against *Staphylococcus aureus* as is nisin, an antibiotic isolated from another lactobacillus.

Control Difficult

Topley *et al.* (*Lancet*, 1951, ii, 137) emphasise the difficulty in controlling *Pseudomonas pyocyanus* in the infection of burns. This organism is shown adversely to affect the healing time of burns and the 'taking' of skin grafts. The organism appears not to be brought under control by the use of penicillin. The authors find that *Pseudomonas pyocyanus* is sensitive to polymyxin, which may be used to control the infection of burns by this organism.

Polymyxin is a generic name for a group of very similar antibiotics with basic polypeptide structure, obtained from *Bacillus polymyxa*. They are mainly active against gram-negative organisms and have appreciable toxicities which have limited their systemic use. Nevertheless, their potencies are high and they are regarded as more effective than streptomycin against gram-negative bacteria. Resistance appears not to develop.

The Veterans' Administration Committee on streptomycin has made a most important report to the Council on Pharmacy and Chemistry of the American Medical Association (*J. Amer. Med. Ass.*, 1951, 147 (3), 253) on the 'Chemotherapy of Tuberculosis in Man'. The report points out that, while some success has been achieved in curing miliary tuberculosis (a form in which the infection is disseminated through the body) and meningeal tuberculosis, no certain cure has yet been achieved in pulmonary tuberculosis by the use of streptomycin.

The two disadvantages remain of toxicity and development of streptomycin-resistance, whether streptomycin or dihydrostreptomycin be used—contrary to what was at one time thought. Control of toxicity may be achieved to some extent by diminishing the amount and frequency of dose, and the best regimen is 1 gram of streptomycin twice a week. Similarly, the incidence of resistance is diminished by intermittent dosage, combined with concomitant dosage with

p-aminosalicylic acid, the adjuvant effects of which, however, are stated not to be so great as was at one time thought. Streptomycin-resistant bacilli are not considered to pose the serious public health problem at one time feared, because although some patients developed resistance, surprisingly few other patients were infected by them. Nevertheless, Harold (*Lancet*, 1951, ii, 658) describes two cases of the spread of infection by streptomycin-resistant strains and, after a survey of the literature, draws attention to the danger.

Streptomycin Preferred

The Committee's report states that, in the treatment of tuberculosis by antibiotics, streptomycin remains the best antibiotic by a large margin, only neomycin, viomycin and mycomycin otherwise being of interest, because they are effective *in vitro* against streptomycin-resistant strains of *Mycobacterium tuberculosis*. Neomycin, however, is a kidney irritant and may lead to total deafness because of specific damage to the cochlear branch of the eighth cranial nerve, which, of course, is well known to be affected by streptomycin. Viomycin has a toxicity similar to streptomycin in direction and degree. Mycomycin is reported still to be in the laboratory stage and the main problem with this antibiotic is stability at room temperature. Aureomycin and terramycin appear to offer little of interest in the control of tuberculosis.

Coming to chemotherapy by agents other than antibiotics, ACTH and cortisone have been shown to exacerbate the infection in animals. As mentioned in the first part of this review Le Maestre (*J. Clin. Invest.*, 1951, 30, 435) found that the administration of cortisone in far-advanced cases of pulmonary tuberculosis induced a transient feeling of well-being after which the symptoms returned equal to or worse than those experienced before the administration of the drug. (See also, *J. Amer. Med. Ass.*, 1951, 147 (3), 238-242).

Show Greater Promise

Bologorod *et al.* (*Dis. of Chest*, 1951, 20, 1; through *J. Amer. Med. Ass.*, 1951, 147 (6), 600) have found that combinations of a semithiocarbazone with streptomycin or with streptomycin plus *p*-aminosalicylic acid seemed to show greater promise than the use of any one of these drugs alone.

The Veterans' Committee, however, hold out little hope for semithiocarbazones on the

grounds of toxicity and of efficacy. Semithiocarbazones have been found to damage the liver and to cause blood dyscrasias. Each reaction is probably reversible but the use of this group of drugs is limited thereby. The semithiocarbazones were first introduced by Domagk, the discoverer of sulphonamides. Acetylaminobenzaldehyde - semithiocarbazone is probably the most active of the group and is known as 'Conteben' in Germany and as 'Tibione' in the U.S.A.

The Committee consider that Benemid does not assist in the treatment of tuberculosis; nor does the alkaloid cephavantidine (used in Japan in recent years for the treatment of tuberculosis and leprosy), which is not considered to warrant a therapeutic trial on the basis of the results of laboratory investigation.

It is to be noted that the 1951 Addendum to the British Pharmacopoeia of 1948 permits streptomycin hydrochloride, sulphate or calcium chloride complex to be dispensed when streptomycin is prescribed; but dihydrostreptomycin may only be dispensed when specifically ordered.

Search Continued

Lowe *et al.* (*J. Chem. Soc.*, 1951, 3286) continue their search for compounds with anti-tuberculosis activity and demonstrate that a number of bis- and mono-diethyl-aminoethyl ethers of stilboestrol and hexylresorcinol have high activity *in vitro* against *Mycobacterium tuberculosis*, but no activity *in vivo*.

Fleury (*Bull. Trav. Soc. Pharm.*, Bordeaux, 1950, 88, 68) has developed a method for the colorimetric determination of *p*-aminosalicylic acid (which is used as an adjuvant in streptomycin therapy), as such or in conjugated form in body fluids, by a colorimetric method using ferric iron in standardised conditions, which is claimed to be as accurate as results obtained by procedures based on diazotisation. Stelt and Nauta (*Pharm. Weekbl.*, 1950, 85, 474) have described a method for the manufacture of *p*-aminosalicylic acid by carboxylation of *m*-aminophenol with carbon dioxide at high pressure with the formation of 4-amino-6-hydroxy-isophthalic acid as a by-product.

Bruchausen *et al.* (*Arch. Pharm.*, Berlin, 1950, 283, 110) claim that samples of *p*-aminosalicylic acid found on the market have proved to consist of the 5-amino isomer instead of 4-amino-2-hydroxy-benzoic acid.

They describe identification tests which discriminate between the two isomers.

Because of the toxicity of 4: 4'-diaminophenyl sulphone, which is active against *Mycobacterium tuberculosis*, many attempts have been made so to modify its chemical structure as to maintain chemotherapeutic efficacy and, at the same time, to reduce toxicity. Smith *et al.* (*Amer. Rev. Tuberc.*, 1949, 60, 62) brought evidence to show that derivatives were reduced to the parent substance in the body. Since *p*-aminosalicylic acid has been found to be notably non-toxic, consideration has been given to the potentialities of nuclear derivatives of these sulphones which would be structurally related to *p*-aminosalicylic acid. For example, Friedlander and French (*Amer. Rev. Tuberc.*, 1947, 56, 360) found 4: 4'-diamino-3-methoxyphenylsulphone had twice the *in vitro* action of the parent sulphone but no results of *in vivo* tests are known to be available.

Synthesis Reported

Linnell and Stenlake (*J. Pharm. and Pharmacol.*, 1950, 2 (12), 937) were prompted to investigate *ortho*-hydroxylated substituents in the 4: 4'-diaminophenylsulphone molecule, in the light of the established activity of *p*-aminosalicylic acid against *Mycobacterium tuberculosis*, taken in conjunction with the known biological oxidation of sulphanilamide to 4-amino-2-hydroxybenzene sulphonamide in certain animals (Thorpe and Williams, *Biochem. J.*, 1941). These workers report the synthesis of 4: 4'-diamino-2: 2'-dihydroxy - diphenylsulphone. Amstutz simultaneously reported the synthesis of this latter compound (*J. Amer. Chem. Soc.*, 1950, 72, 3420). Limited *in vitro* tests with mice experimentally infected with *Mycobacterium tuberculosis* indicate that 4: 4'-diamino-2: 2'-dihydroxyphenylsulphone may be considerably less toxic and more effective than the parent compound.

The *Pharmaceutical Journal* (4 August, 1951, p. 82) has reported in summary some of the papers read at a conference in Dublin during July, under the auspices of the Medical Research Council of Ireland dealing with the 'Chemotherapy of Tuberculosis'. Feldman discussed the techniques available in the use of experimental animals as the step prior to clinical testing and stressed the small value of *in vitro* testing in this application of chemotherapy. On the other hand, Ungar appears to have taken the view that *in vitro* tests are valuable in 'screening'

likely compounds provided the conditions of control were adequate. Dogmagk discussed the semithiocarbazones.

The B.C.G. (*Bacillus Calmette-Guerin*) vaccine which has been so enthusiastically used prophylactically against tuberculosis on the continent of Europe continues to undergo clinical trials in the United Kingdom; but it is considered too early to report on its benefits (*Report of Med. Res. Council*, 1948-50, p. 11).

Comprehensive Survey

Nungester has contributed a comprehensive survey on 'Mechanisms of Man's resistance to Infectious Diseases' (*Bact. Rev.*, 1951, 15 (3), 105) which will repay study by those interested in the field.

The Society of Public Analysts held a valuable symposium in October on the Evaluation of Chemotherapeutic Agents' (*Nature*, 1951, 168 (4281), 865; *Lancet*, 1951, ii, 866). Methods were surveyed both generally and in relation to specific types of infection.

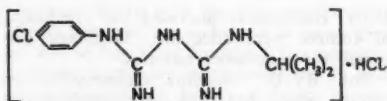
Hinshelwood has surveyed 'The Physical Chemistry of Drug Action' (*Chem. and Ind.*, 1951, No. 44, 918) and Ing has reviewed the 'Effect of Spatial Factors in Drug Action' (*Chem. and Ind.*, 1951, No. 44, 926).

Antimalarial drugs are still the subject of intensive study although—with one exception—there appear to have been no dramatic developments since the introduction of paludrine (proguanil; N¹-*p*-chlorophenyl-N⁵-isopropylguanide) which is now official in the 1951 Addendum to the British Pharmacopoeia of 1948.

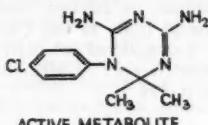
Action Probably Differs

Davey, Rose *et al.* (*Nature*, 1951, 168 (4286), 1080) point out that the mode of action of paludrine probably differs from that of other antimalarial drugs, and the evidence was in favour of the postulation of the existence of an active metabolite. This metabolite has now been isolated from the urine of animals and of man to whom paludrine was administered. The intermediary metabolite was found to be about ten times as active against *Plasmodium gallinaceum* in chicks as paludrine.

The chemical evidence points to 2: 4-diamino-1-*p*-chlorophenyl-1: 6-dihydro - 6: 6-dimethyl-1: 3: 5-triazine as being the active metabolite:—



PROGUANIL HYDROCHLORIDE



ACTIVE METABOLITE

The metabolite may be synthesised by condensing N'-p-chlorophenylguanide with acetone in carefully selected conditions, and the synthesis is the subject of a pending patent. The antimalarial activity of a wide range of dihydrotiazines prepared from di-guanides, aldehydes and ketones has been examined. 2: 4-diamino-1-(3: 4-dichlorophenyl)-1: 6-dihydro-6: 6-dimethyl-1: 3: 5-triazine has shown outstanding activity with an effective dose of about one-hundredth that of proguanil against *Plasmodium gallinaceum* in chicks.

A comprehensive review of recent research in all aspects of malaria is to be found in *British Medical Bulletin*, 1951, 8 (1), p. 1 *et seq.* This includes a survey of chemotherapy in malaria by Davey.

(To be continued)

Canada's Aluminium

THE importance of aluminium and Canada's rôle in world markets is exemplified in a booklet entitled 'Aluminium in World Affairs', in which are outlined the various phases in the development of this strategic metal in Canada. The booklet, published by the Canadian Institute for International Affairs, is written by Richard Redler, and covers the growing production trends and the importance being placed on this metal both in defence and civilian use. After reviewing the prospects of future development and uses of aluminium the booklet concludes that Canada should remain the dominant country on the international markets, accounting, as at present, for 75 per cent of international ingot trade. With regard to other parts of the world, the future of Canada's aluminium industry is tied to the success of efforts to restore conditions of free multilateral trade, it states, adding that by 1955 Canada will have an

exportable surplus of about 460,000 tons, with a value, at present prices, of \$184,000,000. Full development of hydroelectric potential at Kitimat (B.C.), could raise this total considerably.

Campaign Under Way

RECENTLY, Dr. Rees Ogwyn Jones, principal scientific officer of the Department of Scientific and Industrial Research, started a one year's campaign in Wales to induce industrialists to carry out more research to stimulate production and efficiency. He is working in conjunction with the Industrial Association of Wales and Monmouthshire.

It was the first time that an officer of the department had been sent to an industrial area to undertake such a task. Many industrialists, he said, were not aware of the research facilities that existed, and it was his task to put them in touch with the research establishments that could help them.

There should be at least one person technically qualified in research even with a small firm, he said. He expected to find many firms whose production could be considerably improved if they were aware of the latest technical developments.

Plentiful Barium Nitrate?

THE economic commercial production of barium nitrate, a possible forbear for producing over 40 industrial chemicals—due to the insolubility of barium sulphate—is claimed to be possible by Arthur Herbert, of the Barium Development Corporation of New York. Present commercial production of the nitrate is via thermal reduction of barytes to the sulphide, treatment with soda ash to give the carbonate, and then application of nitric acid. Herbert claims that direct treatment of barytes with soda ash can yield a 60 per cent conversion. Textbooks say that powdered barytes boiled with concentrated soda ash solution will yield barium carbonate, but only in 10 per cent yields. A 40 per cent conversion would be needed to make the process economically feasible. The success of this process would mean a vast difference to the production of salts like potassium nitrate, hitherto only achieved by fractional crystallisation of sodium chloride from its solution. As no details of the process are available, however, pending patents, no one yet knows whether the textbooks are right or not.

Plastics in the Tropics

Performance on Prolonged Exposure Reported

A REPORT on the performance of plastics in the tropics has just been published by the Ministry of Supply (HMSO, 1s. 6d.). This is the first of a series and covers the field of expanded plastics—ebonite, polystyrene, PVC, phenol-formaldehyde resin, cellulose acetate, polyvinyl formal (all expanded), and cellular urea-formaldehyde resin. Specimens of these plastics were exposed to carefully selected combinations of tropical conditions for a period of six months. The deterioration in physical state was noted throughout the exposure period and the factors causing that deterioration were examined.

The sites chosen for exposure were in Nigeria. Three types of conditions were decided upon—jungle undergrowth, open desert and termite attack. Ten specimens of each plastic were exposed at sites exhibiting these conditions, one specimen of each being retained in the U.K. as control, and one also being kept in a box with silica gel at Port Harcourt, Nigeria headquarters, also as control. All were weighed and visually examined before the tests. Those exposed at the jungle site were examined frequently during exposure, but it was only possible to examine those at the desert site after three months and at the end of the trial.

Loss in Weight

At the end of the tests all control samples showed a definite loss in weight, polystyrene losing least. Losses of the exposed samples were difficult to determine because of abrasive conditions and contamination by soil and vegetation. Phenol-formaldehyde resin showed little alteration, other than a change in colour, under any of the exposures. The only definite change shown by polystyrene was the excessive abrasion that it suffered at the desert site, which caused large pits in the exposed surface. With ebonite, blistering was a common feature under all conditions, and the material became damp and soft at the humid sites, and warped and wrinkled badly at the desert site, but in no case did it show a tendency to break up. Polyvinyl chloride at the jungle site showed surface marking, and some break-up and cracking as a result of fungal attack but it

remained largely a surface effect and the material was still sound after the six months' exposure.

Urea-formaldehyde resin disintegrated under all conditions, became riddled with insect holes and penetrated by vegetation at the jungle site, and showed excessive erosion at the desert site. Neither cellulose acetate nor polyvinyl formal showed any crumbling or disintegration, but the former developed tiny blisters on the surface, and in one case at the jungle site, the surface was damaged by a fungal patch; one sample at the desert site was scored by what appears to have been a termite trail. The polyvinyl formal samples all showed considerable surface blistering and moderate warping, and one sample in jungle undergrowth displayed cracks at the warp folds. All the polyvinyl formal samples remained distorted after removal from exposure.

Infected in Six Months

All samples at the jungle site became infected with mould within the six months, but the only materials which appeared to be affected were expanded polyvinyl chloride, expanded cellulose acetate and cellular urea-formaldehyde resin.

The only material exposed at the tertiary site which appeared to be entirely free from insect attack was expanded cellulose acetate. However, only in cellular urea-formaldehyde was insect attack excessive. It is possible that the freedom from attack observed in cellulose acetate may be connected with its relatively high density and tough outer skin. Expanded polystyrene and cellular urea-formaldehyde resin exposed at the tertiary site were penetrated by plant roots. It is of interest to note that in the polystyrene some of the cells were of the communicating type and the urea-formaldehyde resin was produced by a foaming process yielding a product of extremely weak and very absorbent cell structure. It might be expected that such products would easily be pierced by growing vegetation. The reason for the comparatively large increase in weight of the polyvinyl formal is not clear, but is probably high water absorption.

Obviously expanded phenol-formaldehyde

resin showed the greatest resistance to all conditions, and was in fact little affected, while cellular urea-formaldehyde resin showed the least resistance, as exhibited by excessive crumbling and general disintegration. The report contains profuse photographs of the specimens after trial, and should prove of great value in the drafting of material specifications for use in the tropics and in the evaluating of performances.

It is realised that factors such as density and actual methods of use of the material may have an influence on the behaviour of materials in practice; work designed to examine the effect of these factors is in hand on two grades of a single type of material and will be reported later.

Institute of Metal Finishing

Programme for Spring Conference

DETAILS of the business programme and social functions connected with its 1952 Spring Conference have now been issued by the Institute of Metal Finishing (Electrodepositors' Technical Society).

Eastbourne, where the successful Silver Jubilee Conference of the ETS was held two years ago, has been chosen for the forthcoming gathering which will be held from Wednesday 23 to Saturday 26 April.

Proceedings will begin with the 1st annual general meeting of the Institute, which will be held in the ballroom of the Grand Hotel at 6 p.m. on 23 April. This will be followed by an informal reception and dinner, and a talk 'In a Reminiscent Mood,' by S. Field, founder-president of the Institute.

Practical and research aspects of metal finishing will be covered by the technical programme, which has been divided into five sessions. The first session will be devoted to polishing, and the following papers will be read and discussed in the morning of 24 April: A. J. W. Moore (Research group on the physics and chemistry of surfaces, University of Cambridge): 'The Physical and Chemical Changes which accompany the Polishing of Metals'; J. Edwards (British Non-Ferrous Metals Research Association): 'An Experimental Study of Electrodepositing.'

In the afternoon, the second session will be on new metal finishing techniques. The three papers will be given by Professor S.

Tolansky (Royal Holloway College, University of London) on 'The Properties of Metallic Coatings Produced by Evaporation and Sputtering'; L. Holland (W. Edwards & Co. (London), Ltd.) on 'Practical Considerations in the Application of Vacuum Coating for Metal Finishing'; and H. H. Vevers and G. E. Gardam (Design and Research centre for the Gold, Silver and Jewellery Industries) on 'Lacquering to Obtain Brilliant and Metallic Lustre.'

Practical plating subjects will be discussed at the third session in the morning of 25 April, when two papers will be presented: 'Electrodeposition of Tin-Antimony Alloys from Chloride-Fluoride Electrolytes,' by J. W. Cuthbertson and N. Parkinson (Tin Research Institute), and 'Plating of Aluminum Articles as a Production Process,' by A. W. Wallbank.

At the fourth session in the afternoon of the same day, the topic will be The Structure of electrodeposits. D. J. Evans and M. R. Hopkins (BISRA) will deliver a paper on 'An Electron Diffraction Investigation of the Structure of Electrolytic Coatings on Iron Single Crystals.' and D. N. Layton (Applied Physical Chemistry Laboratories, Imperial College, London), will speak on 'The Crystal Structure of Electrodeposited Silver.'

Beating the nickel shortage will be discussed at the final session on the morning of 26 April. S. J. Scouse will open the discussion on 'Substitute Undercoats,' J. W. Cuthbertson that on 'Substitute Plates,' and H. Silman that on 'Periodic Reverse and Copper Chrome Deposits.'

Chemical Division Formed

THE establishment of a chemical division which will integrate operations of the company's new sulphur plant to be opened at Jumping Pound, Alberta, next month, and their multi-million dollar petro-chemical plant now under construction at Montreal East, has been announced by the Shell Oil Co. of Canada.

Jumping Pound will convert impurities scrubbed from natural gas into pure elemental sulphur needed by the Canadian pulp and paper industry. The Montreal East petro-chemical plant will initially turn out isopropyl alcohol and acetone which in turn are used to produce many other industrial products.

Big Increase in German Chemical Exports

Modernisation of Coke-Oven Industry Forecast

REMARKABLE progress by West German chemical manufacturers in foreign markets is revealed by the official export figures for the first three-quarters of 1951. Total chemical exports from the Federal Republic in January - September, 1951, amounted to Dm. 1,594,189,000 compared with Dm. 695,755,000 in the same period of the previous year. This figure included ferro-alloys, soap, perfumery and cosmetics, glue and gelatine and in particular rayon, none of which are listed as chemicals according to the U.K. trade classification.

On the British export classification (which also excludes plastics), the total for 1951 would be Dm. 1,327,344,000 as against Dm. 614,932,000 in 1950, a figure which suggests that the West German chemical export trade, for the first time since the war, was similar in volume to the British shipments abroad of chemicals and related products.

Increases over 1950 were largest in the case of plastics, rayon, pharmaceuticals and dyestuffs, that is in the groups which profited from rapidly expanding outputs and the introduction of new products. Comparative figures (in millions), were: Inorganic and heavy chemicals Dm. 384.6 (188.2); dyestuffs and intermediates Dm. 245.5 (102.8); rayon filament and staple Dm. 160.8 (49.8); fertilisers Dm. 160.2 (103.2); pigments and paints Dm. 158.2 (67.4); pharmaceutical products Dm. 140.3 (56.7); plastics Dm. 58.9 (14.5); coal tar products Dm. 41.2 (20.4).

Coke-Oven Industry

The German coke-oven industry last year received sufficient coal to make effective use of virtually the whole of its capacity. The production of by-products consequently increased further. Output of crude coal-tar amounted to 1,397,000 tons in 1951 (against 1,178,000 tons in 1950), of crude benzole to 387,000 (313,000) tons, and of sulphate of ammonia to 84,000 (70,000) tons N.

Tar distillation yielded 55,000 tons of naphthalene, 5,300 tons of phenol (in addition to 3,800 tons of synthetic phenol), 10,400 tons of cresols and xylenols, 399,000 tons of coal-tar oils and 718,000 tons of coal-tar pitch. Substantial tonnages of benzole, naphthalene, tar oils and pitch were

exported to Western Europe and the U.S.A., but higher-grade products were used chiefly at home.

Refined benzole production was increased by substitution of the pressure raffination process for the usual refining process employing sulphuric acid, for a substantial proportion of the total supply.

Investments in Coking Plant

Lack of capital and uncertainty about the future ownership of the Ruhr mining companies have hitherto prevented substantial investments in new coking and by-product plant. Now that the form of organisation of the coal-steel groups has been settled, it is expected that modern coke-ovens will be erected to replace others which are regarded as obsolete but must still be kept in use. Eschweiler Bergwerks-Verein has opened a battery of 30 coke-ovens at Kohlscheid which uses 500 tons of coal a day. To regain the 1938 capacity, this plant is to be doubled. Other companies have drawn up plans for new coking installations and will probably soon put these into effect.

An important contract for two batteries of 89 ovens with an intake of 700,000 tons of coal a year has been received by Dr. Otto & Co., GmbH, Bochum, from Sociedad Siderurgia Argentina. The contract, which also provides for the installation of up-to-date by-product recovery plant is reported to involve equipment to a total value in excess of £2,000,000. It is the first contract for a German coking plant to be received from South America.

The Fischer-Tropsch plant of Chemische Werke Essener Steinkohle AG, at Bergkamen, which was put into commission in April last is still the only plant of its kind in operation. Production starts from purified coke-oven gas, and the output includes *n*-propyl alcohol as well as liquid hydrocarbons and paraffin wax. Krupp Kohlechemie GmbH intends to reopen its synthetic fuel plant at Essen in the course of the next few months. Special attention is to be paid to hydrocarbons with a high boiling point and to solid paraffins. Other owners of Fischer-Tropsch plants, however, have so far shown little practical interest in resuming operations.

A substantial contribution to oil refining has been made by hydrogenation works. Last year the two hydrogenation plants at Gelsenkirchen and Wesseling dealt with 1,116,000 tons of crude oil, and two other plants, those of Scholven Chemie AG and Ruhröl GmbH, are being repaired and extended for use in refining crudes. The total oil refinery throughput last year was 4,560,000 tons, so that hydrogenation plants accounted for one-quarter of the total. The total West German oil refinery capacity is now approximately in line with requirements, and further extensions are justified only insofar as growing consumption demands them.

Perlon production in Western Germany in 1951 is provisionally put at 4,000 tons. As more perlon has become available for the textile industry, an appreciable amount of criticism has been aroused on the grounds that processing requires costly machinery. The producers, however, have declared that no further price reductions are possible after the cut in September.

A new perlon-wool mixture is to be introduced into the German market in the spring. The new fabric will be known as Perlaine and consists of 60 per cent of perlon and 40 per cent of wool. It will be 10 per cent cheaper than natural silk.

Chilean Nitrate Prices

February Revisions Announced

REVISED prices for Chilean nitrate of soda and Chilean potash nitrate effective from 1 February, 1952 until further notice have been announced by the Nitrate Corporation of Chile Ltd. (U.K. Sales Department), Bishopsgate, London.

On the industrial list Chilean nitrate of soda, crystal and granulated, 97/98 per cent, will be sold in lots of six tons or more, delivered carriage paid to any railway station in Great Britain, for prompt delivery at £30 15s. a ton of 2,240 lb. gross weight. Contracts for forward delivery can be made, but the goods would be invoiced at this price or as ruling at date of delivery.

Smaller lots, delivered carriage paid, will be sold at these prices, plus the usual surcharges. Terms of payment are cash in 30 days from the rate of delivery. There are no surcharges for lots of two cwt. or more collected from the company's nitrate depots

and the customary allowance will be made.

For agricultural purposes, Chilean nitrate of soda, crystal 15½ per cent N and granulated 16 per cent N, will be sold in lots of six tons or more, delivered carriage paid to any railway station in Great Britain or c.i.f. main ports in the Isle of Man, for prompt delivery at £30 15s. a ton of 2,240 lb. gross weight. Contracts for forward delivery can be made, but the goods would be invoiced at this price or as ruling at date of delivery.

The same additional surcharges apply for smaller lots as in the industrial list, also the allowances on collection.

Wholesale terms allow a trade commission of 20s. a ton to fertiliser manufacturers and merchants on payment of net cash in 30 days from the date of delivery.

Chilean potash nitrate (agricultural) containing about 15 per cent nitrogen and about 10 per cent potash (K₂O), will be sold in lots of six tons or more delivered carriage paid to any railway station in Great Britain or c.i.f. main ports in the Isle of Man, for prompt delivery at £34 a ton of 2,240 lb. gross weight. Contracts for delivery up to 31 March, 1952, can be made but the goods would be invoiced at this price or as ruling at date of delivery.

Conditions for smaller lots, allowances for collection, and wholesale terms are similar to those for nitrate of soda.

Right is reserved by the corporation to withdraw these price lists at any time without notice.

Plasticiser Prices Raised

INCREASE in the cost of raw materials has made it necessary to raise by 1½d. lb. the price of Bisoflex 81 and Bisoflex 82 (two diethyl phthalates). The new schedule of prices announced by British Industrial Solvents, Ltd., which will be effective on all despatches as from 1 February, is (per lb.) as follows:—

	Bisoflex 81	Bisoflex 82
	s. d.	s. d.
10 tons	3 1½	2 11½
5 tons	3 1¼	2 11¼
1 ton	3 2½	3 0¼
45-gallon drum	3 3	3 1
10-gallon can	3 5	3 3
5-gallon can	3 6	3 4

All prices are carriage paid, in returnable packages.

Growth of Canada's Chemical Industry

Impetus from Shortages & Industrialisation

CANADA's chemical industry has entered a phase which promises to bring a further diversification of its output and a further reduction in the Dominion's dependence on imports, stated H. Greville Smith, president of Canadian Industries, Ltd., in his annual review.

New construction, he said, amounting to \$65,000,000, was a peacetime record. The volume of production of chemicals and allied products was expanded by an estimated 10 per cent. Although the value of total output for the industry in 1951 was not yet available, it was believed that production would reach \$750 million, a gain of 18 per cent over the preceding year. Even more important than the accomplishments of the year, however, were the preparations in hand for further expansion.

The chemical industry, in common with many other producers, had been faced with shortages. Although the raw material situation had threatened to become serious in the early part of 1951 various developments later in the year made for a more balanced relationship between supply and demand. Nevertheless, the supply of a number of chemicals was likely to continue short for some time.

Most Pressing Shortage

Elemental sulphur, which had become the most pressing shortage, was to be manufactured from sour natural gas in two plants under construction in Alberta. In addition liquid sulphur dioxide would be made from smelter fumes in Ontario. Several pulp and paper mills were converting their facilities in order to make use of domestic sulphide ores. By the end of this year, it was estimated, such measures would add the equivalent of 100,000 tons of elemental sulphur to Canada's supplies.

A new plant was also being erected and existing capacity expanded at several locations to meet the increased demand for sulphuric acid.

In addition to the impetus provided by the shortage of specific products, the growth of the chemical industry had been stimulated by such factors as the rapid industrialisation of Canada in the last decade. Possibly the most significant factor was the essentially

dynamic nature of applied chemistry which led to the finding of practical uses for the new forms of matter discovered by research.

As a result of the technical knowledge which had become available on new products, synthetic materials were replacing natural fibres, rubber and resins to an increasing extent. Concomitant with expanded markets and the growth of technology had been the opening up of new Canadian sources of raw materials.

Effective Last Year

These influences had been particularly effective during the past year. Although a total of \$233,000,000 had been invested in new plant, buildings and equipment since 1945, the trend since 1948 was downwards until 1951. According to estimates released by the Bureau of Statistics, a total of \$65,000,000 would have been spent on new plant, buildings and equipment in the chemical industry by the end of 1951, or an amount almost double that of the preceding year. It was also estimated that the industry would have spent \$175,000,000 when the current expansion programme was completed.

An examination of construction projects revealed a significant turning point in the direction of new investment. In the field of petroleum chemicals the largest undertaking in Canada to-day was a project for the manufacture of chemicals used in the production of cellulose acetate and other materials. Natural gas might also be the means of starting production of polythene. Other chemicals were to be manufactured partly or wholly from petroleum raw materials, including ethylene, glycol, acetone, *isopropyl alcohol*, formaldehyde, pentaerythritol and phenol.

Despite the concentration of investment in the petroleum chemical field, a marked expansion was under way in many branches of the industry. Additional capacity would soon be available for the manufacture of a variety of products including phosphorus, caustic soda, chlorine, hydrochloric acid, synthetic ammonia, explosives and plastic resins.

Since 1939, not only had employment and the volume of output been more than

doubled, but production had become more diversified. New materials which now occupied a prominent place in Canadian production and were non-existent or handled as imports 12 years ago, included synthetic rubber, fibres and resins.

Other trends were also clearly discernible. Some products had greatly changed in relative importance—for example, the value of fertiliser output had increased five-fold since 1939. Formerly, most chemicals were consumed largely in the extraction, producing or processing of other materials. To-day, more and more chemicals were gaining a place in their own right as articles used by consumers.

Moreover, so great had been the advances in research and technology in this period, that industrial boundaries were often difficult to determine. Thus textiles now constituted a large part of the output of the chemical industry. Similarly, the base metal smelting and refining industry and the rubber, pulp and paper and other industries used chemical processes and were often important manufacturers of chemical products.

Commitments assumed by the chemical industry during 1951 were greater than anything ever before attempted in peacetime. In order to carry out their obligations, chemical manufacturers would have to make substantial inroads into their financial resources; to apply all of their relevant technical knowledge; and to use with utmost efficiency the full force of their managerial and other trained staff. Prerequisites for further expansion were the recruiting of additional trained personnel, the development of new technology and the advancement of scientific research.

Analytical Chemistry

International Congress for Oxford

ARRAngEMENTS are now almost complete for the International Congress on Analytical Chemistry which will be held at Oxford from 4-9 September under the patronage of the International Union of Pure and Applied Chemistry. President of the congress will be Sir Robert Robinson, O.M., D.Sc., F.R.S., with Sir Wallace Akers, C.B.E., F.R.I.C., as vice-president.

Meetings of the Board and Commissions of Section 5, the analytical chemistry section, IUPAC, will probably be held on 3 and 10 September.

The three main lectures of the congress will be given by Dr. C. J. van Nieuwenburg, professor of chemistry at the Technical University of Delft, Holland; Dr. Ralph H. Muller, of Los Alamos Scientific Laboratory, New Mexico; and Dr. L. H. Lampitt, chief chemist, J. Lyons & Co., Ltd., England.

Scientific sessions have been divided on a broad basis of techniques into nine sections, as follows:—

Microchemical; biological; electrical; optical; radiochemical; organic complexes; reporting of results; adsorption and partition methods; miscellaneous techniques.

Papers dealing with the subjects under the above headings will be issued in pre-print form. About 30 minutes will be allowed for each paper. Authors will not be expected to read their papers but only to give a brief introduction so that ample time for adequate discussion may be allowed.

Official Language English

English will be the official language of the congress, and it is hoped that all papers will be submitted in that tongue. If an author finds it necessary to use French or German for the full text, summaries of his paper must be submitted in each of the other two languages.

During the period of the congress a series of laboratory demonstrations will be given illustrating new techniques or special applications of older techniques in analytical chemistry. In addition to these, but quite separate from them, there will be a trade exhibition of apparatus and books.

Accommodation for men is being fixed up at various colleges, and some will also be available for women. Fuller details will be given on the application form, on which will be set out the registration fee of £2 for the congress, and the cost of the proposed excursions and so on.

Those who hope to attend are requested to apply, not later than 31 March, to the honorary secretary, R. C. Chirnside, Esq., F.R.I.C., Research Laboratories, The General Electric Co., Ltd., Wembley, England.

It is emphasised that this information is of a preliminary nature only to assist the committee, and implies no definite obligation on the part of those complying with the request.

Crude Sulphur Allocations

Committee Announces Apportioning For First Half of 1952

THE Sulphur Committee of the International Materials Conference has announced the allocation of crude sulphur for the first six months of 1952. This is the first of the IMC committees to adopt a longer period than one quarter for allocating.

In preparing a plan of distribution the committee was confronted with the fact that estimated requirements of sulphur as such for 1952 amounted to 7,364,100 long tons as compared with an estimated production of 5,825,100 long tons, representing a shortage of 1,539,000 tons.

Sulphur consumption in 1951 is expected to have reached 6,179,900 tons as against an estimated production of 5,823,600 tons; consumption in 1950 was 6,128,200 tons as compared with a production of 5,722,000 tons.

The shortfalls in 1950 and 1951 were met by reductions in stocks mainly in the producing countries, especially Italy and the United States. In 1952 no further substantial reduction of the stock position in producing countries can be contemplated.

In the fourth quarter of 1951 allocations included the exports of four producing countries only (Italy, Mexico, Norway and the United States). In making the present allocations the Committee took into account all exporting countries for which data were available. It came to the conclusion that the exports of Bolivia, Chile, Colombia and Japan also should be included in the allocation arrangements.

Crude Sulphur Only

As had been done in previous allocations the Committee dealt only with crude sulphur and did not allocate the relatively small quantities which enter into international trade as crushed, ground, refined and sublimed sulphur and in the form of flowers. The Committee expects, however, that trade in these forms of sulphur will continue to follow the normal pattern. Allocations of crude sulphur for the first six months of 1952 (in 1,000 long tons) are as follows:—

Country	Allocation	Import Quota	Export Quota
Canada	2,226.0	N.A.	465.00
United States	14.50	3.00	—
Argentina	58.20	58.20	—
Australia	9.30	9.30	—
Austria	29.50	29.50	—
Belgo - Luxembourg (1949)	30.00	30.00	—
Brazil	6.20	6.20	—
Denmark	0.50	0.50	—
Ecuador	0.05	0.05	—
Egypt	2.80	1.40	—
Finland	9.20	9.20	—
France (1949)	64.50	58.50	—
French North Africa	10.00	10.00	—
Germany, Federated Republic of	38.50	16.00	—
India	23.00	23.00	—
Israel	2.00	2.00	—
Italy	88.00	—	38.00
Mexico	0.90	0.90	12.00
Netherlands	34.20	34.20	—
New Zealand	14.50	—	35.00
Norway	0.50	0.50	—
Pakistan	31.50	23.50	—
Sweden	10.90	10.90	—
Switzerland	33.00	33.00	—
Union of South Africa	194.90	188.70	—
United Kingdom	0.35	0.35	—
British Colonies	1.80	1.80	—
Uruguay	17.00	17.00	—
Oil refineries	1.40	1.40	—
Other importing countries	—	—	—
Other exporting countries	—	—	—
Bolivia	—	—	4.50
Chile	—	—	7.50
Colombia	—	—	2.10
Japan	—	—	5.00
Total	2,953.40	569.10	569.10

Where the allocation exceeds the import quota the difference is explained by domestic production and/or reduction of stocks.

The Ministry of Materials states that firms using sulphur and sulphuric acid in their processes have been making strenuous efforts recently to improve the utilisation of these substances. The Ministry desires to emphasise the continued urgency for conservation measures. Most firms will be aware that, in addition to the efforts of their own staff, they can call upon the help of outside sources, including:—

Universities; technical colleges; professional organisations such as the Royal Institute of Chemistry; consultants; government establishments such as the Chemical Research Laboratory, Teddington, Middlesex, and co-operative industrial research associations, many of which are giving particular attention to the problems of sulphur and sulphuric acid economy.

Acid, Base & Anti-Base

A New Interpretation

AFURTHER contribution to the Bronsted-Lewis electronic theories as to the essential nature of acids and bases, dating back about 30 years, has been made by Professor Jannik Bjerrum, of Chemical Laboratory A (of T.H.) Copenhagen, in *Tidsskr. Kjemi.*, etc., 1948, 8, 129. A condensed version is given in *Angew. Chem.*, 1951, 63 (22), 527-530, 21 November. In this the author attempts to reconcile both theories by the introduction of the concept of an anti-base.

Bronsted's Ideas Reviewed

Bronsted's ideas as amended by Lewis, with his introduction of donor-acceptor reactions, are first reviewed. (See also J. Bjerrum, *Acta Chem. Scand.*, 1947, 1, 528; *Fysick. Tidsskr.*, 1950, 48, 1). Lewis in his work used the following experimental criteria: (a) If acids and bases react together, neutralisation is usually momentary; (b) an acid or base can displace a weaker acid or base from its compounds; (c) acids and bases with suitable indicators can be titrated against each other; (d) they frequently act as catalysts. Bjerrum considers that too close dependence on these criteria has hindered the attainment of clear chemical definition.

In Bronsted's original view an acid is any molecule which is able to split off a proton, while a base is one that can absorb a proton, thus:



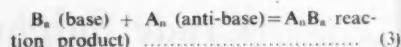
The only difference in the definition of a base between this view and that of Lewis (in which an acid is an acceptor) is that electrons corresponding to:



may be regarded as bases according to Bransted, but not according to Lewis, who did not consider hydrogen an essential constituent of acids. But there are certain difficulties in this view, as exemplified by



Kolthoff has proposed that the Lewis acids should be distinguished from the Bronsted acids as proto-acids, but Bjerrum does not consider this a happy suggestion, and thinks that the term anti-base for the Lewis base-acceptors would be much better, thus:



If anti-bases and protons are identical, then also (3) is identical with (1). Not only is the genetic connection between base, anti-base, and acid clearly indicated, but also the inherent necessity for dealing with these three concepts.

Professor Bjerrum expounds these ideas in detail in connection with some of the literature of the subject, and his theme is both interesting and impressive. He proposes the following definitions to reconcile the Bronsted and Lewis theories:—

Base (ba), Proton acceptor or electron pair donor;

Anti-Base (an), Base acceptor or electron pair acceptor;

Acid (BAH^+), Proton donor.

He adds some examples showing what products result from union of base and anti-base, together with the Redox equilibria, and proceeds to trace the connection between bases, anti-bases, and Redox reactions. He also discusses base strength and complexity, and reactions involved, and concludes with some notes on acidic, basic and anti-basic reactions.

Proton-Free Systems

In an addendum the author refers to the usually proton-free systems existing at very high temperatures, and to the work of Lux with oxide melts (*Z. Elektrochem. angew phys. Chem.*, 1939, 45, 303). Lux after this also proposed a theory as to the nature of acids and bases, the former being molecules that can fix oxygen ions, and the latter (bases) molecules that can split off these ions. But, as Bjerrum points out, the acids here correspond to anti-bases, while the bases are either salt-like compounds or 'anabonds' (an abbreviation suggested for anti-bases and base-donors).

Indian Research Progress

Confidence in Indian research was expressed by Dr. S. S. Bhatnagar, Secretary of the Department of Scientific Research, Government of India, in his address to the Indian Ceramic Society at its annual conference held at the Central Glass and Ceramic Research Institute, Jadavpur, Calcutta. The institute is one of seven National Laboratories already functioning, out of a total of 11 planned.



ORGANIC SYNTHESES. Vol. 31. Editor-in-chief, R. S. Schreiber. John Wiley & Sons, Inc., New York. Chapman and Hall, London. 1951. Pp. 122. 22s.

This series is at its best when each volume, as it is published, gives the reader a mixture of old and new, reliable standard methods for the preparation of well-established, familiar substances and a sprinkling of newer, less familiar methods and recent additions to the chemical literature. There are many of us who carry about schemes for research that can be started only if a certain key substance can be prepared conveniently and in sufficient quantity. To such the publication of a fresh volume is an event as exciting as the announcement of a lottery draw. Will there be, for instance, a simple foolproof method for the preparation of melleic acid? Their disappointment at its non-appearance only whets their appetite for subsequent issues. The present volume is well up to standard and contains details for the preparation of 41 compounds with references to a number of homologues and analogues.

The growing interest in the organic compounds of phosphorus is reflected by the inclusion of three preparations dealing with this class of compound. Trialkyl phosphites are prepared by the action of phosphorus trichloride upon the appropriate alcohol in this case isopropyl or ethyl alcohol. The phosphites can be converted to trialkyl phosphonates by the action of an alkyl halide such as methyl iodide, triisopropyl phosphite giving diisopropyl methyl phosphonate. The Michaelis modification of the Friedel-Crafts reaction with the conventional aluminium chloride catalyst is used for the preparation of phenyl dichlorophosphine from phosphorus trichloride and benzene.

The production of unsaturated compounds by the removal of the elements of water from two substances is a commonplace in organic chemistry and the only interest

inherent in the four examples of this type of condensation is in the manner in which the water is removed. In two cases, the preparation of ethyl- α -acetyl- β -(2,3-dimethoxyphenyl)-propionate from 2,3-dimethoxybenzaldehyde and ethyl acetoacetate, and the preparation of cyclohexylidene cyanoacetic acid from cyclohexanone and cyanoacetic acid, the water is removed from the site of reaction by entrainment with benzene vapour, and collected in a Dean and Stark water separator. This procedure has the advantage that the course of reaction may be followed by measuring the amount of water which collects in the trap. Other preparations use condensing agents such as sodamide or piperidine acetate.

An example of the Meerwein reaction, the addition of diazonium salts to a carbon-carbon double bond, is given by the production of *p*-nitrophenyl butadiene from butadiene and *p*-nitro-benzene-diazonium-chloride, the addition product being treated with caustic potash to remove hydrochloric acid.

In the account of the preparation of dimethyl glutaric acid by the oxidation of dimedone with sodium hypochlorite, the temperature rise during reaction is said to be quite small, but oxidations of this type where chloroform is evolved can become very vigorous when carried out on the large scale, and care may be necessary to reproduce the conditions of the smaller experiment.—J.R.M.

HANDBUCH DER PRÄPARATIVEN ANORGANISCHEMIE. Edited by Georg Brauer. Ferdinand Enke Verlag, Stuttgart. 1951. Part 2. Pp. 160. Figs. 36. Dm. 21.

As already indicated in an earlier review (CHEMICAL AGE, 1952, 66, 31) Part 1 of this work contained the first (general) section and a portion of the second section which deals with the preparation of the elements and their compounds. This latter section

is continued in the part now under consideration.

The chapter dealing with fluorine is concluded, and occupies 50 pages of Part 2, presenting a total, between the two parts, of about 120 fluorine compounds. About one-half of this total is devoted to metallic compounds.

Subsequent chapters deal with the remaining halogens (by M. Schmeisser) and oxygen and ozone (by P. W. Schenk). The chapter on halogens provides about 60 methods for the elements, their hydrates, the halogen hydrides and their derivatives, inter-halogen and polyhalogen compounds, the oxides, the oxyacids and their derivatives. Only elementary oxygen and ozone are dealt with in the following chapter.

Part 2 concludes with the first portion of the chapter on sulphur, selenium and tellurium, by F. Fehér. Approximately 50 syntheses for sulphur and its compounds, and methods for the preparation of various forms of elementary selenium are given. Methods are described for the allotropic forms of sulphur, the hydrides and their derivatives, sulphides and polysulphides, halides, oxides and oxyhalides, the oxyacids and their derivatives, and the miscellaneous compounds (NO)HSO, and S₂N.

The general pattern of Part 1 is followed. The remarks already made about the excellent and clear presentation of the subject matter apply here equally, and the favourable impression made by Part 1 is fully confirmed. One word of criticism is allowable. The binding, in paper, is obviously designed to allow for subsequent rebinding of the completed work in a small number of volumes. Pages come loose readily, and it will require care to avoid loss or damage of pages before such rebinding is possible.

—C.L.W.

Commonwealth Conference

Sir Ben Lockspeiser Heads Delegation

COLLABORATION in research is the main object of the British Commonwealth Scientific Conference which will be opened by the Prime Minister of Australia in Canberra on Monday, 18 February. After a few days the Australian Government will take the delegates by road to Melbourne where the conference will be resumed until 9 March.

Delegates from the United Kingdom,

headed by Sir Ben Lockspeiser, K.C.B., F.R.S., secretary of the Department of Scientific and Industrial Research, left England by air for Australia on 1 February. Accompanying Sir Ben were Sir William Slater, K.B.E., secretary of the Agricultural Research Council, Dr. F. H. K. Green, representing the Medical Research Council, and Dr. Alexander King, head of the Intelligence Division, DSIR. All the self-governing countries of the Commonwealth will be represented by delegations, and colonial research will be represented by Dr. G. A. C. Herklots, of the Colonial Office. The United States Government is also sending observers.

Chairman of the conference will be Dr. Clunies Ross, chairman of the Australian Commonwealth Scientific and Industrial Research Organisation.

Collaboration in Research

Spreading of information and personal contacts between scientists are fundamental to all forms of collaboration in research, and the conference will review the facilities and machinery for attaining these objectives and make general recommendations, where necessary, for improving the present arrangements.

It will then proceed to examine a number of subjects which, after previous consultation between the various countries, have been suggested as possible topics for collaboration. Among industrial subjects now proposed for consideration are industrial microbiology, the use of seaweed, research on metal casting, sulphur production, the use and beneficiation of low-grade ores and wastes, research on wool fibre, soil mechanics, and the use of solar energy.

Agricultural topics include animal climatology, the assessment of new insecticides and fungicides, grassland research in tropical and sub-tropical climates, and the sterility and infertility of animals.

Among the medical subjects are climatic physiology, with special reference to living conditions in the tropics, the effect of radioactive tracers on living cells in plant and animal research, medical biochemistry, with particular reference to such problems as the standardisation of methods of examining blood constituents and the geographical incidence of dental caries.

Another matter which will be considered is relations with international research organisations.

Service to Industry

Activities of Power-Gas Corporation

CONTRACTS amounting to a value of approximately £5,000,000 have been obtained during the year by the Power-Gas Corporation, Ltd., and the company is committed to a degree unparalleled in its history to projects serving the chemical, gas, iron, and steel industries.

This was revealed in the statement of the chairman and managing director, Mr. N. E. Rambush, D.Sc. (Hon.), A.M.I.Chem.E., F.R.S.A., at the 52nd annual general meeting of the company held at Parkfield Works, Stockton-on-Tees, on 30 January. Captain A. Hayton Cowap, vice-chairman, presided, in the absence of the chairman overseas.

Plenty of work lay ahead of the company, according to the statement, including orders received during the last few months for three large blast furnace plants, as well as commissions from gas supply companies for 23 automatic mechanical carburetted water gas plants.

During the period under review rights had been acquired for the exploitation of important new specialities including the Wiggins gasholder, the Panindco dust gasification system for the production of high-grade gas from low-grade fuels, the Hercules processes for the catalytic production of hydrogen and carbon monoxide from richer gases, and the Pease Anthony scrubber for cleaning and washing industrial gases.

South Works Project

The new constructional shop, forming the first stage of the new South Works project, had been brought into production in August last, and the benefit from the resulting increased capacity was already being felt. A sum of £575,000 had been spent on this shop and on the purchase of additional equipment to meet the company's extensive contracting programme.

Group trading profits for the year at £547,000 established a new record, but in view of the programme of capital expenditure which had been embarked upon, it was recommended that the same rate of dividend distribution (12½ per cent) be maintained.

Subsidiaries in South Africa and Australia were in a prosperous state, both in regard to profit earned and work in hand. The value of contracts placed with the Australian company had indeed increased with parti-

cular rapidity, and the chairman and managing director was on a visit to the Commonwealth in connection with the further development of that subsidiary.

During the year 250,000 new ordinary shares had been issued, of which 230,000 had been taken up by shareholders and employees. In addition 20,000 new ordinary shares had been transferred to the proprietors of Rosedowns Holdings, Ltd., together with £25,000 in cash, and the company now owned two-thirds holding in the equity capital of that company.

Mr. Wilfred Beswick, to whom tribute was paid at the company's Golden Jubilee celebrations, resigned the chairmanship on completion of his 50 years' service, and Mr. R. R. Crewdson also retired from the board after achieving the same period of time in the service of the company.

Tribute was paid to the excellent relations between the company and employees both at home and abroad. One of the features of the new South Works factory was that the final layout and arrangement of plant and machinery had been decided after regular and close consultation between shop management and a committee selected by the workers themselves.

American Contract Secured

BRITISH success in the face of keen American competition has won for the Bristol Instrument Company, of Weymouth, an important contract for the instrumentation of a large coke oven plant at St. Louis, Missouri, U.S.A., which is being built by another British firm, Simon Carves, Ltd.

Achievement of the instrument company was all the more creditable as its competitors included the parent concern of Bristol's—the instrument making firm—founded to manufacture the inventions of the late Professor W. H. Bristol, one of the founders of America's industrial instrument industry.

The control panel, which would normally represent one year's work for the Weymouth factory was completed in six months. It is 27 ft. long and 7 ft. high and incorporates instruments for measuring, recording, and automatically controlling pressures, temperatures and rates of flow. Some of the instruments are adaptations of the latest American designs by the parent company, while a number of the features included have not previously been applied to coke oven plants.

• HOME •

Chemical Price Changes

The following increases in prices, as from 1 February, are announced by Laporte Chemicals, Ltd., Luton, Beds: Sodium percarbonate, 12½ per cent available oxygen, by 1s. 10½d. to £8 8s. 4½d. a cwt. in 1 cwt. kegs. Sodium sulphide, by 10s. a ton, solid 60/62 per cent spot raised to £30 a ton, delivered in drums; broken to £30 15s. a ton, delivered in drums.

British Industries Fair, 1952

More space than in 1951 has been taken by exhibitors in eight trade groups at this year's British Industries Fair which will be held at Olympia and Earls Court, London, and Castle Bromwich, Birmingham, from 5-16 May. An attempt will be made to show how plastics are of special significance by their substitution for metals over a wide range of industries. The plastics section at Earls Court will be half as big again as it was last year.

Cationic Polymerisation Conference

Discussions on cationic polymerisation and related problems will be held at an informal conference which is being convened at the University College of North Staffordshire. The first session will begin at 2 p.m. on Monday, 24 March, with Dr. D. D. Eley (Bristol) as opening chairman, and will end on the afternoon of Wednesday, 26 March.

Address on Dyeing

Dr. G. H. Lister, of Sandoz Products, Ltd., addressed the West Riding Section of the Society of Dyers and Colourists at Bradford on 31 January. His subject was 'Miscellaneous Dyeing Problems'. Mr. C. O. Clark presided.

Dean Delivers Address

At the January meeting of The Evans Scientific Association (Evans Medical Supplies, Ltd.), Professor H. Berry, B.Sc., Ph.C., F.R.I.C., Dip. Bact., Dean of the School of Pharmacy, University of London, delivered an address on 'The Disinfecting Action of Phenols in Soap Solutions'. In addition to members of the Society, a party from the Liverpool School of Pharmacy attended the lecture.

U.K. Nickel Allocation

Allocations of primary nickel for the first quarter of 1952 were announced on 4 February by the International Materials Conference, Washington. The United Kingdom was allotted 5,170 tons out of the total available quantity of 33,583 metric tons.

Extensively Used

Plastics have been extensively used in the re-opened dining quarters at Imperial Chemical Industries' London headquarters, Imperial Chemical House, Millbank. 'Formica' laminated plastic, made by Thomas De La Rue & Co., Ltd., has been used together with I.C.I.'s own 'Vynide' leather-cloth, 'Perspex' lighting fittings, and 'Alkathene' tubing. 'Formica' was chosen for bar and table-tops, in surfacing window-ledges, and for the back-fittings of the service counter.

A Difficult Task

Mining of potash deposits discovered in Whitby, Yorkshire, referred to by Mr. Bevan in the House of Commons debate on 31 January, would be a difficult and costly operation, said Mr. A. Spearman, Conservative M.P. for Whitby, on 1 February. Mr. Spearman said that it would be necessary to go down to 4,000 ft. and it was estimated that the sinking of a single shaft would cost about £1,000,000. Lord Swinton, Chancellor of the Duchy of Lancaster, had promised there would be no unreasonable delay in the Government deciding what part it would play in mining operations.

Conference on Fluidisation

A Conference on Fluidisation Technology, organised by the Chemical Engineering Group of the Society of Chemical Industry, will be held in London on 12 and 13 June, 1952, it is announced. The arrangements for the conference are not yet complete, but it is expected that at least twelve papers will be read and that a dinner to the foreign delegates will be arranged. These arrangements however, may have to be modified and should at present be regarded as provisional. A small registration fee may perhaps be charged and a detailed notice will be circulated in due course.

• OVERSEAS •

To Roast Sulphides

Iron sulphide concentrates will be roasted to produce much-needed sulphur in a new plant being built in Berlin, New Hampshire, U.S.A., by a large paper concern. The process will utilise tailings which are a by-product of the refinement of copper ore by the flotation process. This material will be supplied by a copper refinery in Vermont. It is believed the cost of production will compare favourably with the cost of elemental sulphur from Louisiana and Texas.

South African Vermiculite

There is now an increasing demand both at home and abroad for South African vermiculite—a complex hydrated magnesium, iron, aluminium silicate ore used for insulation after expanding by heat—with the result that existing quarries, it is thought, cannot remain adequate for long. Further deposits will have to be located soon and put into production, it is forecast.

Australian Gift to India

The Government of Australia have made an offer of scientific equipment to India to the value of Rs. 5,000,000 under the Commonwealth Technical Assistance Scheme. This is in addition to the cost of training a sufficient number of Indians in Australian Institutions. A senior scientist from Australia has been visiting the Sindri Fertiliser Factory and other institutions, with a view to assessing exact requirements.

Cellulose Production Planned

A national company for the production of cellulose is to be set up in Israel following the successful conclusion of experiments by the Israel Research Council on the use of local vegetation in the manufacturing process. These experiments have shown that many low-growing plants in the Negev Region of Southern Israel are suitable for the process in addition to various types of straw and weeds.

To Commence Drilling

The Barbados Gulf Oil Co. has been engaged in a seismic survey in an endeavour to locate a suitable site for drilling its first deep test well. Drilling is scheduled to commence shortly, it is reported from Port of Spain.

Indian Carbide Factory Opens

A factory with a production capacity of 850 tons per annum for manufacturing calcium carbide has been started at Talayuthu, in the southernmost tip of India. The location of the factory has been conditioned by the available supply of pure limestone and nearby port facilities. At the moment, the chemical is being imported at the rate of about 10,000 tons per annum from Canada, Africa and Norway.

Fluoridisation Approved

Approval for the principle of fluoridation in the U.S.A. was granted recently by the Medical Sciences Division of the National Research Council of America and the American Medical Association, thereby helping to scotch rumours that the treatment prevents rapid blood coagulation, makes bones brittle, affects an unborn child deleteriously, and is hard on the kidneys. According to the chief of Public Health Service, only 138 of the 16,750 public drinking water supplies in the U.S.A. are now fluoridised, while 1,750 have enough or too much natural fluorine.

British Guiana Bauxite

Operations of the Demerara Bauxite Co., Ltd., British Guiana, have been increased by the erection of new kilns at Mackenzie which will be used exclusively for the production of calcined ore, with a capacity of 120,000 tons per annum. The erection became necessary in order to meet the increased demand for calcined ore by the refractory and abrasive industries throughout the world.

Argentine Minerals

The marketing of minerals in Argentina has been placed in the hands of the Instituto Argentino de Promoción del Intercambio by a decree dated 2 January, 1952. Minerals were previously marketed by the Argentine Industrial Credit Bank.

Colombian Celanese

Celanese Colombiana S.A. has installed a factory near Cali for the production of artificial silk thread by the acetate process and it is intended that it shall eventually be sufficient for all local requirements. The capital of the company is 20,000,000 pesos.

PERSONAL

MR. G. P. BELSHAM has been appointed a joint managing director of Brookhirst Switchgear, Ltd., of which company he has been a director since 1948.

MR. K. N. SWASH, B.Sc., A.M.I.E.E., has been appointed a director of Brookhirst Switchgear, Ltd., having been chief engineer since 1948, and having a total of 24 years' service with the company.

Staff and employees of I.C.I. Ltd. (Nobel Division) presented a TV set to **MR. HORACE BARLOW, M.B.E.**, production manager, on his retirement after 39 years at Westquarter factory, Polmont.

SIR HENRY TIZARD, F.R.S., will deliver the Messel Medal address entitled 'The Strategy of Science,' at the annual general meeting of the Society of Chemical Industry which will be held in Aberdeen on Wednesday 9 July.

The Textile Institute Medal, by which recognition is given for distinguished services to the textile industry in general, and to the Institute in particular, is to be presented to **PROFESSOR W. E. MORTON, M.Sc.Tech., F.T.I.**, Professor of Textile Technology, Manchester College of Technology, and to **MR. W. R. WADSWORTH, J.P.**, managing director, Wm. Frost & Sons, Ltd., Macclesfield.

The Institute's Service Medal, awarded in recognition of valuable services to the Institute, is to be presented to **MR. F. KENDALL, F.T.I.** Textile Consultant and Manager of the Physical Testing Laboratory, Bradford Dyers' Association, and to **MR. R. J. SMITH, F.T.I.** Textile Technologist at I.C.I. Ltd., Dyestuffs Division, Blackley, Manchester.

The Council of the Institute of Metals has made the following awards of medals for 1952:—

The Institute of Metals (Platinum) Medal to **MR. WILLIAM STANLEY ROBINSON**, until recently president of the Consolidated Zinc Corporation, Ltd., in recognition of his outstanding services to the non-ferrous metal industries in developing the Australian zinc-lead industry and the British zinc industry.

The Rosenhain Medal to **PROFESSOR ANDRE GUINIER**, Conservatoire National des Arts et Métiers, Paris, in recognition of his outstanding contributions in the field of physical metallurgy, particularly in connection with precipitation phenomena.

The W.H.A. Robertson Medal to **MR. CYRIL ERNEST DAVIES**, for his paper on 'The Cold-Rolling of Non-Ferrous Metals in Sheet and Strip Form,' published in the *Journal*, 1951, vol. 78, pp. 501-536.

MR. ERIC DRAKE, of the Anglo-Iranian Oil Company, arrived in Australia on 3 February by air to complete details of a new £30,000,000 oil refinery to be built near Perth, in Western Australia. The refinery, when completed (in 1955), will have a capacity of 3,000,000 tons of crude oil per year.

A talk on 'Glass in Science and Industry' was recently given to the Rotary Club of Stafford by **MR. BRIAN H. TURPIN**, technical and sales director of Quickfit & Quartz, Ltd., manufacturers of laboratory and industrial chemical glassware. Mr. Turpin traced the development of glassmaking through the ages, pointing out that it was one of the oldest arts known to man. He then described the various products of the Quickfit & Quartz factory.

Obituary

MR. THOMAS ALEXANDER MAXWELL ROBERTS, sales director of Imperial Chemical Industries, Ltd., Metals Division, has died at his home, Wylde Green, Birmingham. He was 51. His service with I.C.I. Metals Division began in 1916, when he joined the staff of Elliott's Metal Co., Ltd. Selly Oak. In 1928, he moved to the headquarters at Witton. He became metal sales manager in 1932 and was appointed to the Metals Division Board in 1945.

He was chairman of the Brass and Copper Tube Association and the Extruded Brass and Copper Alloys Association and a member of the executive committee of the Cold Rolled Brass and Copper Association and of the Advisory Committee of the High Conductivity Copper Association.

Publications & Announcements

CHEMICAL research carried out by the M. W. Kellogg Company in its laboratories at Jersey City, N.J., is graphically illustrated by a number of striking photographs reproduced in No. 2 (1951) of its journal 'Kellogram'. As two examples of the work carried out in its laboratories details are given of some of the research and development required in bringing fluid hydroforming—recently announced new catalytic process for improving the octane rating of naphthas—on to the commercial scene, and how Kel-F, special fluorocarbon-type plastic, was developed from a wartime secret to its present prominence as a specialised material.

* * *

'CAN the Chemist Solve the Raw Material Problem?' is the subject of an article by A. Cairncross, of Glasgow University, in the Review of Industry, Commerce and Finance (January, 1952) published by the *Manchester Guardian*. Other articles of interest in the section 'Techniques for Industry' include: 'Research with Tracer Elements', 'Electronic Aids for Textile Mills', and 'Substitutes for Coal?—the Hope of Atomic Power' and 'Oil for Coal?' by M. H. L. Price, of the Clarendon Laboratory, Oxford.

* * *

RESISTANCE of stainless steel to contamination and the importance of its use in plant for the processing of syrups and juices is described in the February issue of 'Enchiridion', published by Firth-Vickers Stainless Steels, Ltd. The widespread applications of the company's various brands of stainless steel are illustrated by examples ranging from steel edges for skis for members of the British team which will compete at the Olympic Ski-ing Championships in Norway to the re-equipment by the Ford Motor Co., Ltd., of Dagenham, of over half its pallets in the sintering plant with Firth-Vickers 'Vesuvius' heat-resisting steel containing about 26 per cent chromium.

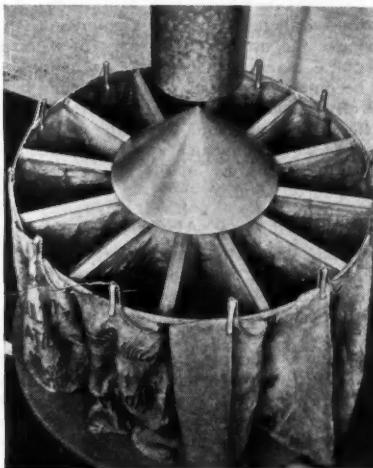
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THE part of the chemical engineer in process development in the food and agricultural industries is discussed in an article by W. L. Faith (Corn Products Refining Co.) in the *Midwest Engineer* (Vol. 4, No. 3) published by the Western Society of Engineers,

Evanston, Illinois. The article traces the interest of chemists and chemical engineers in the agricultural process industries to the early thirties when they were called upon to 'bail agriculture out of its economic prison' to find methods of using agricultural products industrially.

* * *

COLLECTION in a sack or similar container of granular materials when discharged in bulk has for many years presented a difficult handling problem. The materials build up quickly at the outlet and choking easily occurs. To prevent this, the presence of an operator is permanently required.



A step towards overcoming this trouble is a multi-bagging attachment (patent applied for), produced by Dallow Lambert & Co., Ltd., Leicester, which requires the minimum of attention. The equipment comprises a steel cone mounted centrally on an iron framework which is divided into 12 sections and supported on a circular metal fabricated base with castors. The empty containers are attached as in the accompanying illustration; no hooks or straps are employed.

When the equipment is placed directly under the discharge outlet the material flowing out is evenly distributed to each of the 12 sacks.

Organic Nomenclature

Commission's Conclusions

INTERESTING conclusions of the Commission on the Nomenclature of Biological Chemistry, appointed by the International Union of Pure and Applied Chemistry, include the admission of the so-called 'a' system into possible use where the older systems fail. This system was first used to name difficult heterocyclic ring compounds by supposing that all the atoms were carbon and using the prefix of the heterocyclic atom with 'a' on the end to denote its position. Thus, in a straight-chain compound (which the Commission does not yet sanction being named by this system), $\text{CH}_3\text{OCH}_2\text{NHCH}_2\text{OCH}_3$, instead of being di-(methoxymethyl)-amine, would be 2,6-dioxa-4-azahexane. The Commission recognises the use of this system for naming complex mixed chains but does not want it to become out of hand. The rule being tentatively considered allows the use of the system for open chains where the old names would be inconvenient and impractical. Further conclusions on the subject will be issued in due course.

'Amyl' Abolished

Among the 'cleaning-up' operations of the Commission, it has abolished the use of 'amyl', and substituted 'pentyl'—a systematic name and one long overdue, and confirmed the names for amino-acid radicals such as glutamyl, cysteinyl, etc., as well as for the vitamins and carotenoids. An interesting observation was made concerning trade-names which tend to cause confusion by their too close relationship with the systematic Geneva nomenclature. Thus, referring to a British firm marketing a substance called 'Nonanol' it points out that according to the Geneva Convention, the term 'Nonanol' should be used only for the five straight-chain alcohols of formula $\text{C}_n\text{H}_{2n}\text{OH}$, where the hydroxyl is on different carbon atoms. The product being marketed, it alleges, consists essentially of 3,5,5-trimethyl-1-hexanol, a branched-chain nine-carbon alcohol, and recommends that it should not be used as a trade name in any case, as the name refers to more than one compound. Another case of misuse of the Geneva system, remarked on by *Chemical & Engineering News*, is the use of the terms isopropanol and isobutanol. This is run-

ning with the hare and hunting with the hounds. The *iso* part is a remnant of isopropyl alcohol and isobutyl alcohol. Geneva naming denotes the position of the hydroxyl and other groups numerically, thus: 2-propanol, and 2-methyl-1-propanol.

I.C.I.'s Wilton Project

Nine Plants Functioning

NINE of the ten divisional plants which constitute the first stage of the development at I.C.I.'s Wilton works, near Middlesbrough, have been brought into operation and the tenth will be functioning in about a year's time. So far, however, only one-tenth of the Wilton site has been fully developed and there are 50 years of work ahead should I.C.I. so decide. This was disclosed by Dr. J. W. Armit, chairman of I.C.I. Wilton Division, when he recently addressed members of the Tees-side group of the Institute of Industrial Administration at the Cleveland Scientific and Technical Institution at Middlesbrough.

Recalling that construction of the Wilton works began in 1946, the doctor said that there were now employed on the site 2,360 factory workers and 745 administrative staff, and a further stage of development was on the way embracing 'Terylene', phthalic anhydride and other plants. By 1954 it was expected that the numbers employed would have increased to some 4,000 factory workers and about 900 administrative staff.

'Terylene' Plant Planned

During the four years from 1947 until last year no further plants were scheduled for erection at Wilton but the successful completion of extensive research and development work carried out by the Plastics and Dyestuffs Division on the new fibre, 'Terylene', had resulted in the decision to build a 5,000-ton plant at Wilton.

Following this it had been agreed to erect a large phthalic anhydride plant and certain smaller plants of the Dyestuffs Division, while the addition of two further units to the Alkali Division's polythene plant were also put in hand. These plants together constituted the second stage of Wilton's development. A third phase was already under consideration with the possibility of constructing vinyl polymer, acetylene and even ammonia plants.

The Rotary Draw Former

New Tool Shapes Titanium Metal

THE shaping of titanium, one of the highest melting metals known, is one of the achievements of the newly developed Rotary Draw Former, a tool brought out by the Cyril Bath Machinery Company, of Cleveland, Ohio, for stretch-forming high-melting alloys for use in jet engines and the like. As titanium withstands temperatures up to 1,930°C. and can withstand a tensile pull of up to 62 tons per sq. in., it is not only hard to shape, but difficult to extract from its ores and consequently expensive. Conventional methods of shaping rings and similar parts involves prodigious waste—a five-pound ring requires a block of metal weighing 350 lb., while with a Rotary Draw Former only 5½ lb. of metal are used to start with—and with titanium at £9 per lb. old methods are impossible. The Former ranges in size from 12½ to 100 tons, and rings up to 48 in. diameter have been drawn with a tenthousandth tolerance for variation in cross-section or circumference. In the final operation the rings are held in a welding fixture and automatically welded with atomic hydrogen, the cooling being so rapid that distortion in the finished ring is held to a minimum. No re-stretch operation is required, and, indeed, in these tough metals re-stretching is seldom satisfactory.

The Rotary Draw Former will produce equally well elliptical or rectangular shapes, it is said, as well as long sweeping open curved shapes, reverse bends or curves in two planes. It will also form aluminium or bronze as well as alloy extrusions, and will vary the angularity of the extrusion, while forming the work. It will also form round, square or other hollow tube shapes, and sheets of all sorts and sizes can be handled by changing to suitable jaws. These machines are reported to be on order by most manufacturers of jet engine parts.

Fertiliser Subsidies Bill

AN annual expenditure not exceeding £10,000,000 on fertiliser subsidies is proposed in the Agriculture (Fertilisers) Bill, the text of which was published on 31 January. The subsidy will consist of contributions of up to half of the expenditure incurred by farmers on fertilisers.

A maximum of £10,000,000 is envisaged

because, as a memorandum to the Bill explains, it is not at present intended to make contributions at the maximum rate of half the cost.

The financial memorandum to the Bill states that, if contributions on the basis laid down in the Bill continue for more than one year the cost for 1951-52 is estimated at £500,000 and for 1952-53 at £13,000,000, the latter cost exceeding the maximum because of the inclusion of payments in respect of fertilisers acquired in 1951-52. The annual charge of £10,000,000 may be decreased or exceeded after a change in the rate of contributions or of the fertilisers eligible for subsidy.

Contributions, according to the provisions of the Bill, may be paid only in respect of fertilisers delivered to farmers between 1 July, 1951, and 30 June, 1956, unless this period is extended by affirmative resolution of both Houses of Parliament.

Administrative costs of the scheme are estimated at £30,000 a year.

Notification of Vacancies Order

SHORTAGE of manpower is one of the problems which threaten to hinder the fulfilment of the defence programme and the further expansion of Britain's export industries.

As a step towards overcoming this, the Notification of Vacancies Order, 1952, will come into operation on 25 February. Under the Order all persons who wish to change their employment or those who are seeking work will be guided into jobs which are not only suitable for them but are also of national importance. There will be no 'direction,' and workers covered by the Order may state their preference for other kinds of work.

An employer may still advertise if he has a post vacant which it is desired to fill, but it must be made plain to applicants that they must apply to an employment exchange or scheduled employment agency.

Employments exempted from the Order include agriculture, coal-mining, dock work (registered), merchant shipping, sea fishing, police and fire services, and employment in a professional, administrative or executive capacity.

A leaflet in the current popular form of a 'quiz' of questions and answers has been issued as a guide to understanding the Order.

Next Week's Events

MONDAY 11 FEBRUARY

Society of Chemical Industry

Leeds: University, Woodhouse Lane, 7 p.m. Professor R. L. Wain (University of London): 'The Chemical Control of Plant Growth'.

TUESDAY 12 FEBRUARY

Institution of Chemical Engineers

London: Burlington House, Piccadilly, W.1, 5.30 p.m. D. F. Kelsall: 'Preliminary Study of the Motion of Solid Particles in an Hydraulic Cyclone'. K. A. Fern: 'The Cyclone as a Separating Tool in Mineral Dressing'.

Incorporated Plant Engineers

Cardiff: Institute of Engineers, Park Place, 7.15 p.m. J. F. Copp: 'Aspects and Problems of Modern Pumping Machines' (illustrated).

Society of Instrument Technology

Manchester: College of Technology, 7.30 p.m. Dr. Hartshorn: 'Fundamentals of Electrical Measurement'.

WEDNESDAY 13 FEBRUARY

Society of Chemical Industry

London: Burlington House, Piccadilly, W.1, 6.30 p.m. Joint meeting of the Food and Microbiology Groups. Miss E. R. Hiscox and Mrs. E. R. Cookson: 'The Effect of Reworking and Blending on the Bacteriological Flora of Butter'.

Royal Institute of Chemistry

London: South-West Essex Technical College, Forest Road, Walthamstow, E.17, 7 p.m. Dr. J. L. Edgar: 'Chemicals from Petroleum'.

Dublin: University College, 7.45 p.m. E. E. Cox: 'Generation of Power from Turf'.

Royal Society of Arts

London: John Adam Street, Adelphi, W.C.2, 2.30 p.m. Dr. J. D. McGee (E.M.I. Research Laboratories): 'Television Technique as an Aid to Observation'.

Physical Society

London: Institute of Ophthalmology, Judd Street, W.C.1, 3.30 p.m. 65th science meeting of the Colour Group. Dr. G. W. Granger: 'An Experimental Study of Colour Preferences'.

THURSDAY 14 FEBRUARY

The Chemical Society

Dundee: University College, 5.15 p.m. Dr. G. Gee: 'Some Equilibria and Reactions with Sulphur'.

Gloucester: Technical College, 7 p.m. Dr. H. W. Thompson: 'Applications of Infrared Spectroscopy to the Study of Plastic Polymers'.

Nottingham: University, 4.45 p.m. Professor L. Hunter: 'La Liaison d'Hydrogène'.

Royal Institute of Chemistry

Lancaster: Storey Institute, 7.30 p.m. Liverpool and North-Western Section. K. W. Pepper: 'Ion Exchange'.

The Royal Society

London: Burlington House, Piccadilly, W.1, 4.30 p.m. J. A. W. Huggill: 'The Flow of Gases through Capillaries'; J. B. Hasted: 'Inelastic Collisions Between Ions and Atoms'.

Pharmaceutical Society

Manchester: Houldsworth Hall, Deansgate, 7.45 p.m. J. R. Walmsley: 'The BP and BPC Addenda'; Professor H. Brindle: 'The National Formulary'; H. Burlinson: 'Technicians in Pharmacy'.

Oil and Colour Chemists' Association

London: 26 Portland Place, W.1, 7 p.m. London Section. Dr. W. Hughes: 'The Physical Characteristics of Titanium Pigments'. The talk will be followed by discussion after which light refreshments will be available. Non-members will be welcome.

FRIDAY 15 FEBRUARY

Society of Chemical Industry

London: Technical College, Brighton, 7 p.m. Joint meeting with London and South-Eastern Counties Section, RIC. Dr. W. L. Bedwell: 'The Production of Sulphuric Acid from Calcium Sulphate'.

London: King's College, Strand, W.C.2, 7 p.m. Fine Chemicals Group. Short Original Papers by Members.

The Chemical Society

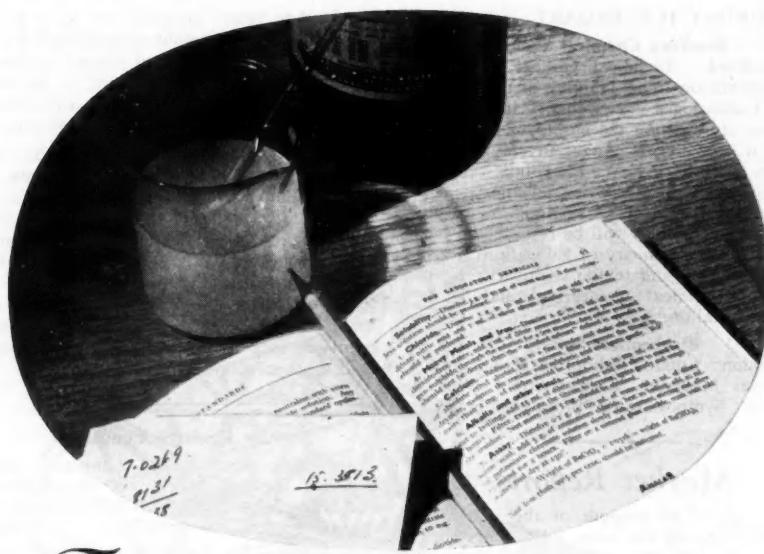
Glasgow: Royal Technical College, 7.15 p.m. Dr. J. S. Anderson: 'Some Recent Work on the Chemistry of Metallic Oxides'.

Institute of Physics

Manchester: University, 7 p.m. Dr. J. D. Craggs (Liverpool University): 'Counting Methods'.

Society of Dyers and Colourists

Manchester: Gas Showrooms, Town Hall Extension, 6.30 p.m. E. Waters and H. Sumner (I.C.I., Ltd., Dyestuffs Division): 'The Effect of Soaping on Vat Dyes'.



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SATURDAY 16 FEBRUARY

Bradford Chemical Society

Bradford: Technical College, 2-5 p.m. Conference on 'The Training of the Chemical Technologist'. Speakers in the first session representing the employer's point of view will be: G. B. Angus (dyeing), G. W. Green (metallurgy), W. L. Thomas (textile chemistry), Treffor Davies (chemical engineering). In the second session teaching of chemical technology will be represented by, A. W. Doyle (Ministry of Education), R. L. Elliott (dyeing and textile chemistry), K. L. Butcher (chemical engineering), and N. K. Petch (metallurgy).

Biochemical Society

London: London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1. 11 a.m. Symposium on 'Lipid Metabolism'.

Market Reports

LONDON.—The strength of the industrial chemical market has been fully maintained during the past week and a steady flow of new business has been reported, while contract delivery specifications have covered good quantities. Prices are firm and changes have been few. A reduction in the controlled price for pig lead has lowered the prices for the chemical compounds, and the new basis rates are: dry white lead £196 10s. per ton; ground in oil £214; litharge dry red lead £189 10s.; dry orange lead £201 10s.; ground in oil red £212; ground in oil orange £224; lead nitrate £154 2s. 6d. An advance of £10 in the price of glycerine B.P. has been notified by the home manufacturers operating as from 1 February. With most products well sold forward activity in the coal tar products market continues to depend on availability of supplies. Pitch is in brisk demand for home and Continental account, while creosote oil and A.D.F. cresylic acid are in strong request for shipment to U.S.A.

MANCHESTER.—Marked firmness has again been in evidence in most sections of the chemical market during the past week. Further advances in a number of lines, including hydrogen peroxide, the barium compounds, sodium sulphide, borate of soda, and glycerine as well as in all classes of fertiliser materials, have come into operation since the last report. Home-trade demand

for leading heavy chemicals is on a good scale, and a fair amount of additional business has been booked on export account. A further gradual improvement in the call for fertilisers has been reported, while there is a steady trade in most of the tar products.

GLASGOW.—Generally speaking, the demand has been quiet from most sections of the consuming trade and it may be that pending price increases to be notified at the beginning of this month have had some bearing on the lack of interest shown by buyers for forward delivery. With regard to export, there has been no falling off in inquiries here. Unfortunately home commitments in a number of cases have precluded manufacturers from quoting.

Notable Research Conclusion

According to reports, Langmuir and Schaefer in their work on atmospheric nucleation have discovered that alcohols in the air prevent the formation of artificial snowstorms. An American newspaper has commented that this may explain why it doesn't rain over Times Square on New Year's Eve.

Fellowships for Mexicans

The programme fostered by the Camille and Henry Dreyfus Foundation Inc. to assist in the elevation of chemistry teaching standards in Mexico is being carried on this year by the appointment of two new Mexican teachers for graduate study of chemistry at Harvard University. The Foundation, which is granting the fellowships, was established by the founders of Celanese Corporation of America.

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SALES ENGINEER required to handle electronic equipment for the Metallurgical and chemical industries. Must possess university degree or equivalent qualification. London area. Write, giving full details as to age, previous experience and qualifications, to Box No. C.A. 3108, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

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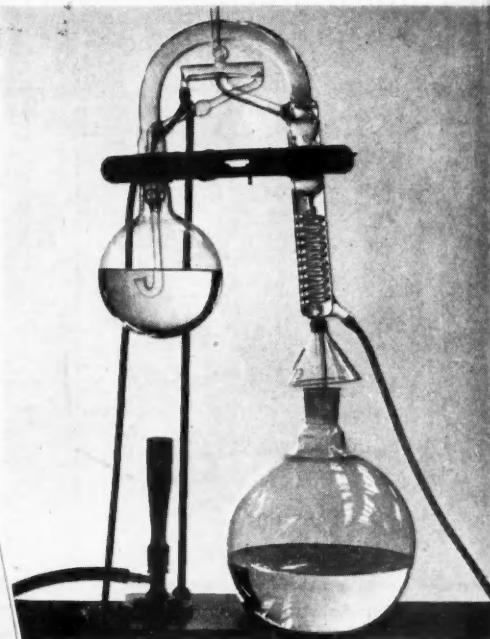
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